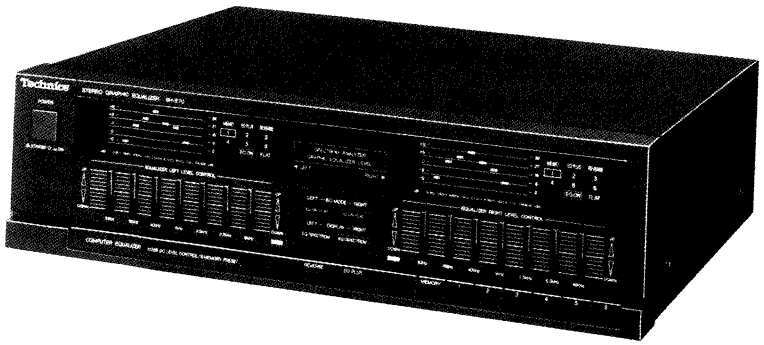
ORDER NO. HAD8704080C8

Service Manual

Stereo Graphic Equalizer

Equalizer

SH-E70



Color

(K) . . . . Black Type

Color	Areas
(K)	[D] . . . . . Continental Europe
(K)	[EH] . . . . Holland
(K)	[EB] . . . . Belgium
(K)	[EF] . . . . France
(K)	[EK] . . . . United Kingdom
(K)	[EG] . . . . F.R. Germany
(K)	[Ei] . . . . . Italy
(K)	[EW] . . . . Switzerland
(K)	[XL] . . . . Australia
(K)	[XA] . . . . Asia, Latin America, Middle Near East, Africa & Oceania
(K)	[XB] . . . . Saudi Arabia

SPECIFICATIONS
(DIN 45 500)

Frequency response (center position)	: 5 Hz~100 kHz (−1 dB)
Maximum output voltage	: 7 V (1 kHz, THD 0.03%)
Rated output voltage	: 1 V
Maximum input voltage	: 7 V (1 kHz)
Rated input voltage:	: 1 V
Rated total harmonic distortion	: 0.005% (20 Hz~20 kHz), at 1 V ouput 0.003% (1 kHz), at 1 V output
Input sensitivity	: 150 mV
Signal-to-noise ratio	: 99 dB/1 V (105 dB/1 V, IHF'A)
Input impedance	: 47 kΩ
Gain	: 0±1 dB
Channel balance 250 Hz~6300 Hz	: ±0.5 dB
Channel separation 1 kHz	: 70 dB
Equalization-level controls	: +12 dB~−12 dB (7 frequency ranges, in 2-dB steps)
Center frequencies	: 63 Hz, 160 Hz, 400 Hz, 1 kHz, 2.5 kHz, 6.3 kHz, 16 kHz

GENERAL

Power supply	: AC 50 Hz/60 Hz, 240 V
Power consumption	: 11 W (with power switch at STANDBY: 6.5 W)
Dimensions (W×H×D)	: 360×103×281 mm (14 3/16" × 4 1/16" × 11 1/16")
Weight	: 3 kg (6.6 lb)

Note

Specifications are subject to change without notice.
Weight and dimensions shown are approximate.

■ CONTENTS

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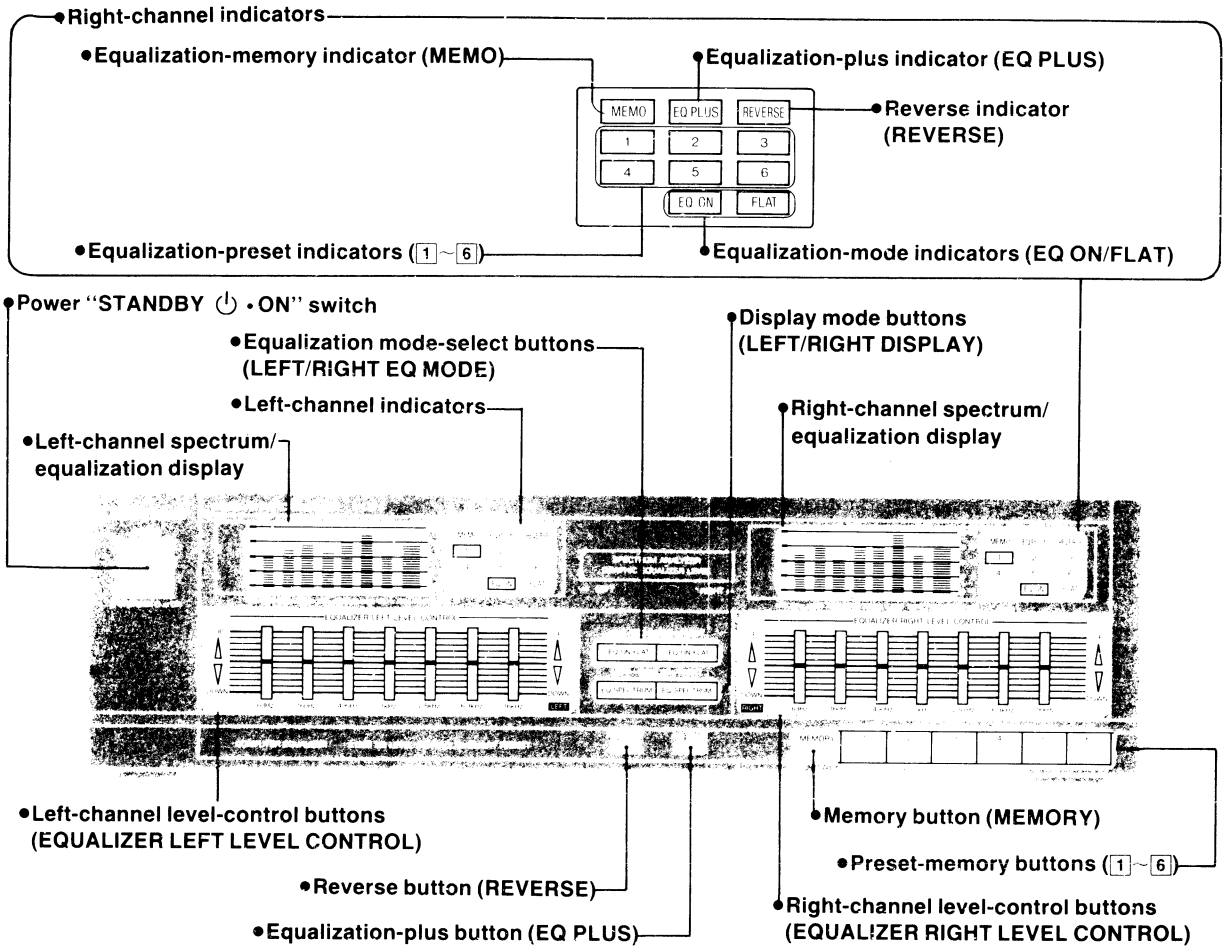
Technics

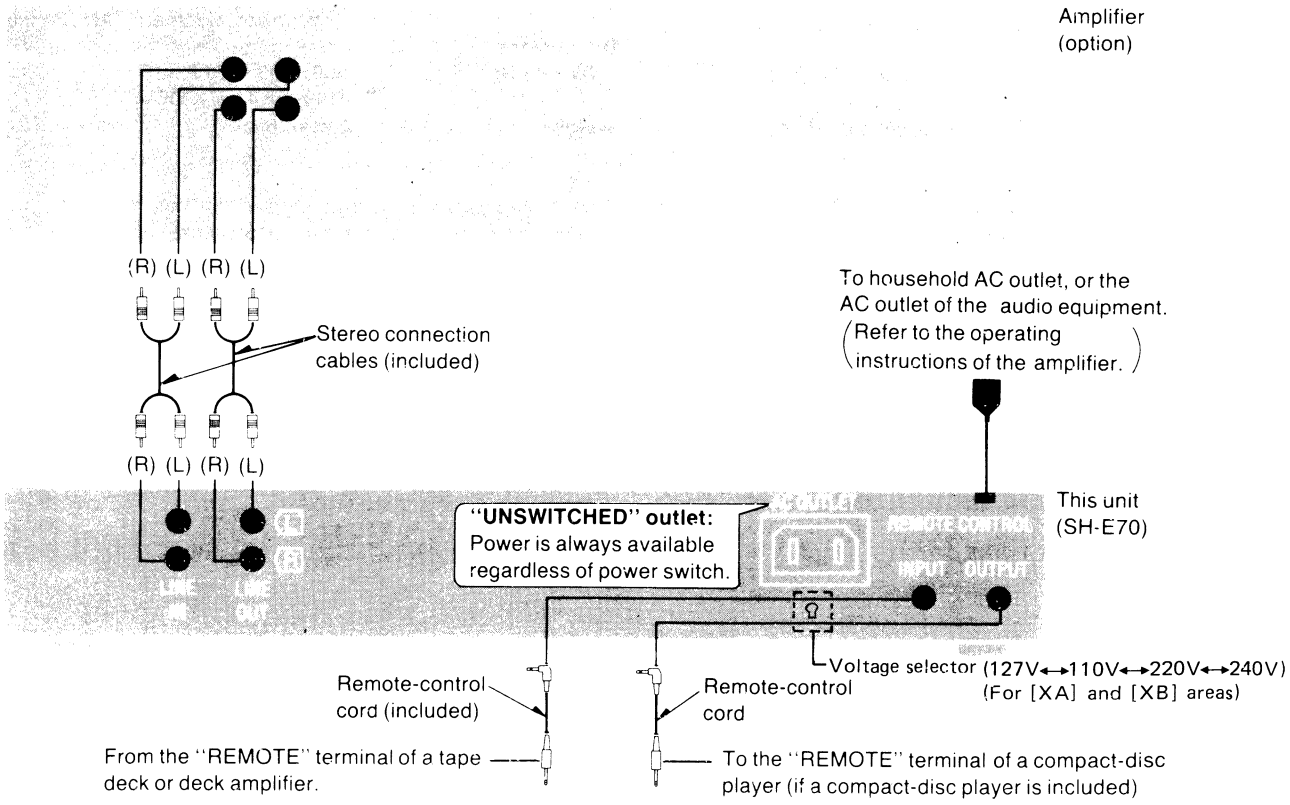
Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

■ LOCATION OF CONTROLS



■ CONNECTIONS

This is an equalizer that provides effects both during tape recording and play if it used while connected to an amplifier (such as models SU-X880, SU-X860, SU-X840, SU-X830, SU-X820, etc.) that has "EXT IN/OUT" terminals.
If this unit is connected to an amplifier that does not have "EXT IN/OUT" terminals, its effects are limited to play only.


Amplifier (option)
(R) (L) (R) (L)
Stereo connection cables (included)
(R) (L) (R) (L)
To household AC outlet, or the AC outlet of the audio equipment. (Refer to the operating instructions of the amplifier.)
"UNSWITCHED" outlet: Power is always available regardless of power switch.
This unit (SH-E70)
Voltage selector (127V↔110V↔220V↔240V) (For [XA] and [XB] areas)
Remote-control cord (included)
Remote-control cord
From the "REMOTE" terminal of a tape deck or deck amplifier.
To the "REMOTE" terminal of a compact-disc player (if a compact-disc player is included)

■ OPERATION

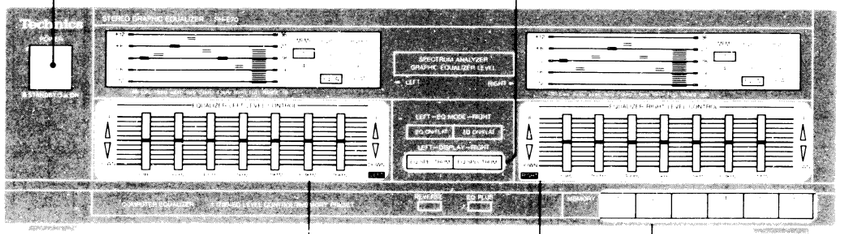
Note: Turn the amplifier on, and set it for listening to the sound. (Refer to the operating instructions of the amplifier.)

Because as many as six types of equalization curves can be stored in the memory of this unit, tone quality adjustments according to each tune can be made in fine detail and very easily.

1 Reduce the volume level of the amplifier.
(Set the amplifier's tone controls to the center position, and set the super bass switch to "OFF".)

2 Set the power switch to "ON".

3 Set to "EQ".
(When aurally adjusting the equalization effect while watching the spectrum analysis display, set to "SPECTRUM".)



4-1 How to adjust to the desired tone quality

There will be a change (in 2-dB steps) when the "UP" or "DOWN" button for the frequency you want to adjust is pressed.

4-2 How to adjust to the tone quality settings stored in the memory

By simply pressing one of these buttons, the desired sound can be easily selected.

5 Adjust the volume level of the amplifier.

"MOST RECENT" memory

If, after the buttons and equalization levels of this unit have been set, the power is switched to STANDBY and then switched ON, the setting of each button and the equalization levels will be entered into the memory, and these settings will return when the power is switched ON.

Memory back-up

Lithium batteries are used to retain the data stored in the memory, thus safeguarding the memory entries made by the various buttons, as well as the equalization curves of the equalization display, or curves stored in the memory, even if there is no power to this unit.

A word about the lithium batteries

This unit employs lithium batteries for back-up of the memory if a power failure occurs, but these batteries will no longer provide that back-up if they become weak.

If battery replacement is necessary, consult with the store where the unit was purchased, or any store where Technics products are sold, or an authorized Service Center (see enclosed list).

- Battery life ..... about 10 years
- Part No. BR2032-1VC

WARNING!

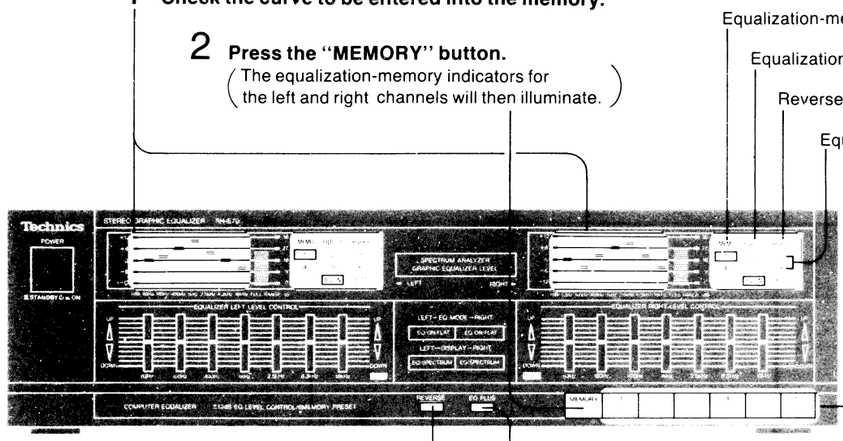
LITHIUM BATTERIES. EXPLOSION DANGER. CHANGE OF BATTERIES MUST ONLY BE DONE BY QUALIFIED PERSONNEL AND AS DESCRIBED IN THE SERVICE MANUAL.

Memorization of equalization curves

If, after an adjustment is made to the desired sound, this adjusted sound setting is entered and stored in the memory, it will thereafter be possible to easily produce sounds by simply pressing one or more of the preset-memory buttons ([1]–[6]).

1 Check the curve to be entered into the memory.

2 Press the "MEMORY" button.
(The equalization-memory indicators for the left and right channels will then illuminate.)

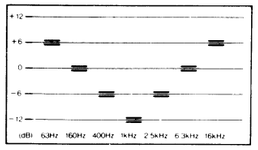


3 Press one of the preset-memory buttons ([1]–[6]), whichever is to be used to make the entry to the memory.

To produce a reversed equalization curve

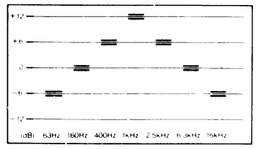
Press the "REVERSE" button.
(In this way, you can instantly produce a curve that is the opposite of the curve being displayed.)

This feature can be used, for example, to listen to the original sound characteristics of a tape that has been recorded with special equalization effects by using the graphic equalizer.



First, display the curve used when the recording was made.

Then press the "REVERSE" button.
(The frames around the reverse indicators will illuminate.)

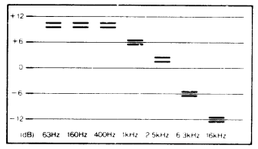


The playback sound will then be corrected by this curve, and will become a flat characteristic.

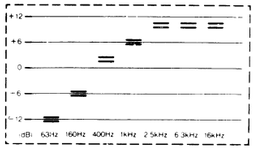
How to combine two or more types of equalization curves

Another equalization curve can be easily produced.

For example:



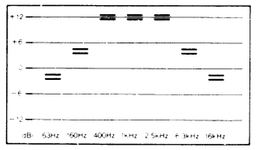
Display a curve with a suppressed high range.



Press the "EQ PLUS" button.
(The frames around the equalization-plus indicators will flash for about five seconds.)

Curve retrieved from memory (not displayed)

During the time that the equalization-plus indicators are flashing, press the preset-memory buttons ([1]–[6]) corresponding to the memorized curves that you want to use in the newly combined curve.



The newly combined curve is then displayed.
(The frames of the equalization-plus indicators, and the frames of the equalization-preset indicators corresponding to the curves used for the combination, will illuminate.)

The equalization-plus function

1. This function can be used to combine curves entered and stored in the memory by using the preset-memory buttons.
2. This function can also be used to combine a curve adjusted to the desired sound (by using the level-control buttons) with a curve entered and stored in the memory by using one of the preset-memory buttons.

■ EXAM

■ **Cutting**
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SION DANGER.
ONLY BE DONE
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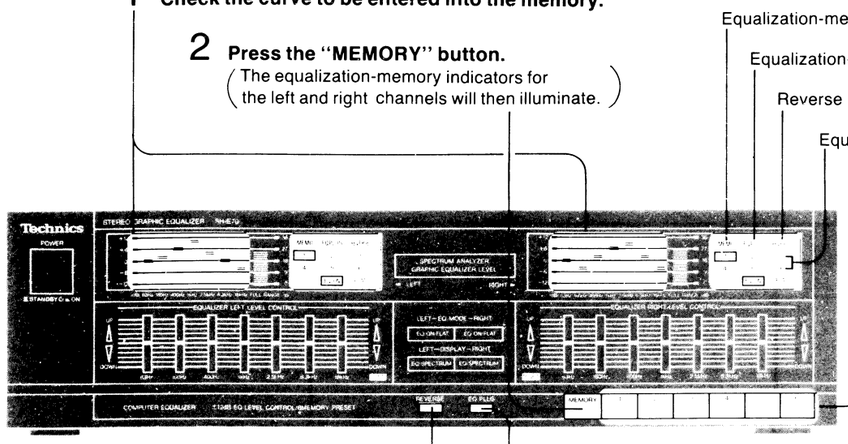

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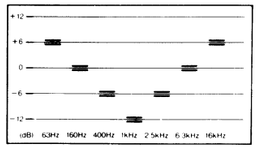

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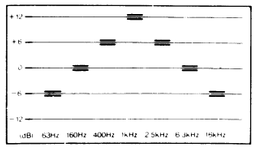

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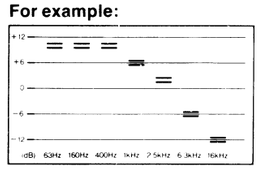
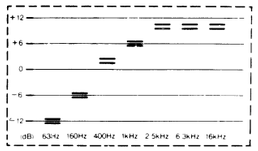


Display a curve with a suppressed high range.



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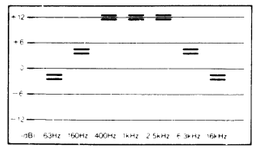

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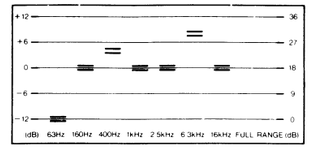
■ EXAMPLES OF APPLICATIONS

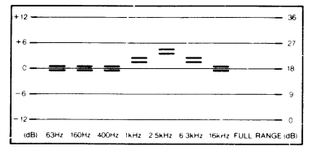
■ Cutting the noise from live recording tapes

Live tapes recorded outdoors generally contain popping noises caused by wind and various other noises from the surrounding area. In order to effectively eliminate wind noise, cut bass sounds below 63 Hz and raise the level of sounds in the 400 Hz range. Then control sounds made by birds, etc., with a 6.3 kHz adjustment.



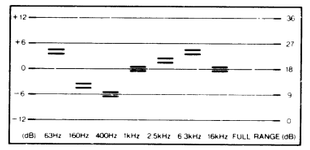
■ Producing clear vocals

For female vocals, raise the level of the 1 kHz~2.5 kHz range by 2~4 dB. To rectify omission, raise the level of the 6.3 kHz vicinity slightly.
Male vocals can be improved by raising the level of the 400 Hz~2.5 kHz range.
Below is an example of a female vocal correction.



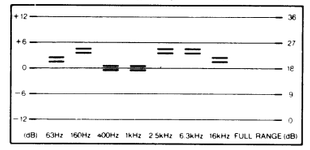
■ Making tapes for car stereos

Tapes can be made exclusively for the listening conditions inside a vehicle. Merely raise the 63 Hz level 4 dB.
For medium and low frequencies, centering on the 400 Hz vicinity, lower the modulating effect by raising the 2.5 kHz~6.3 kHz vicinity by 2~4 dB.



■ Adding some power to disco music

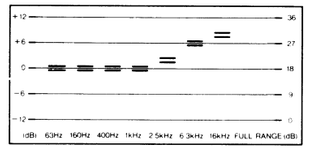
Increase the power of bass guitars and bass drums by raising the level of the 63 Hz~160 Hz range, and raise the level of sounds from 2.5 kHz to 16 kHz. The result will be greatly emphasized low frequency sounds and strong, clear high frequency sounds.



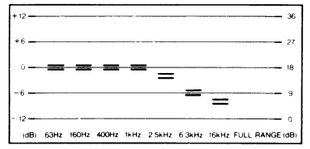
■ Reducing tape hiss

Tape hiss can be effectively reduced by slightly raising the level of high frequency (above 2.5 kHz) sounds during tape deck recording, and then lowering them during playback.
(This can be done conveniently by using the reverse button.)
Note:
If sounds above 6.3 kHz are raised too much, distortion may result in the tape deck. Prevent this by watching the level meters of the tape deck and setting the recording levels appropriately.

Recording



Playback



■ ACCESSORIES

●Stereo connection cables 2

(SJPK2202–1)

●Remote-control cord 1

(SJP2257K)

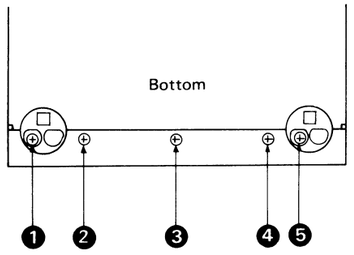
■ DISASSEMBLY INSTRUCTIONS

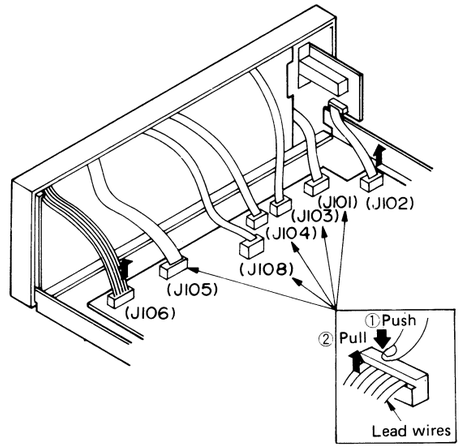
"ATTENTION SERVICER"
SOME CHASSIS COMPONENTS MAY HAVE SHARP EDGES.
BE CAREFUL WHEN DISASSEMBLING AND SERVICING.

Ref. No. 1	How to remove the cabinet
Procedure 1	1. Remove the 4 screws from both sides of the cabinet and the screw from its back.

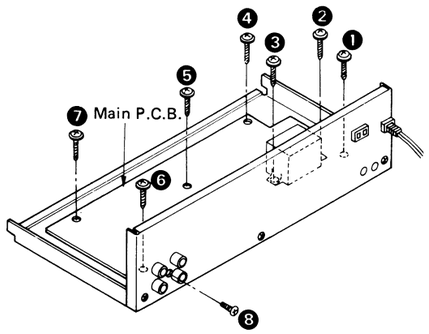
Ref. No. 2	How to remove the front panel
Procedure 1 →2	1. Disconnect the leads from the 7 connectors (J101, J102, J103, J104, J105, J106, J108).

2. Remove the 5 screws (❶ ~ ❺) from the front panel.

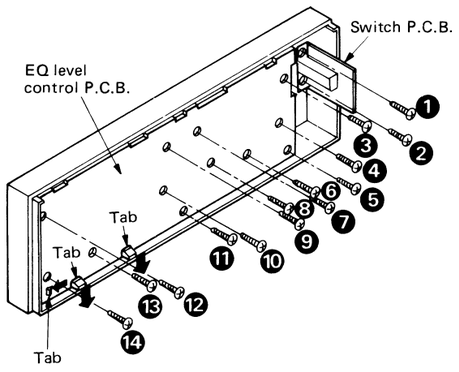




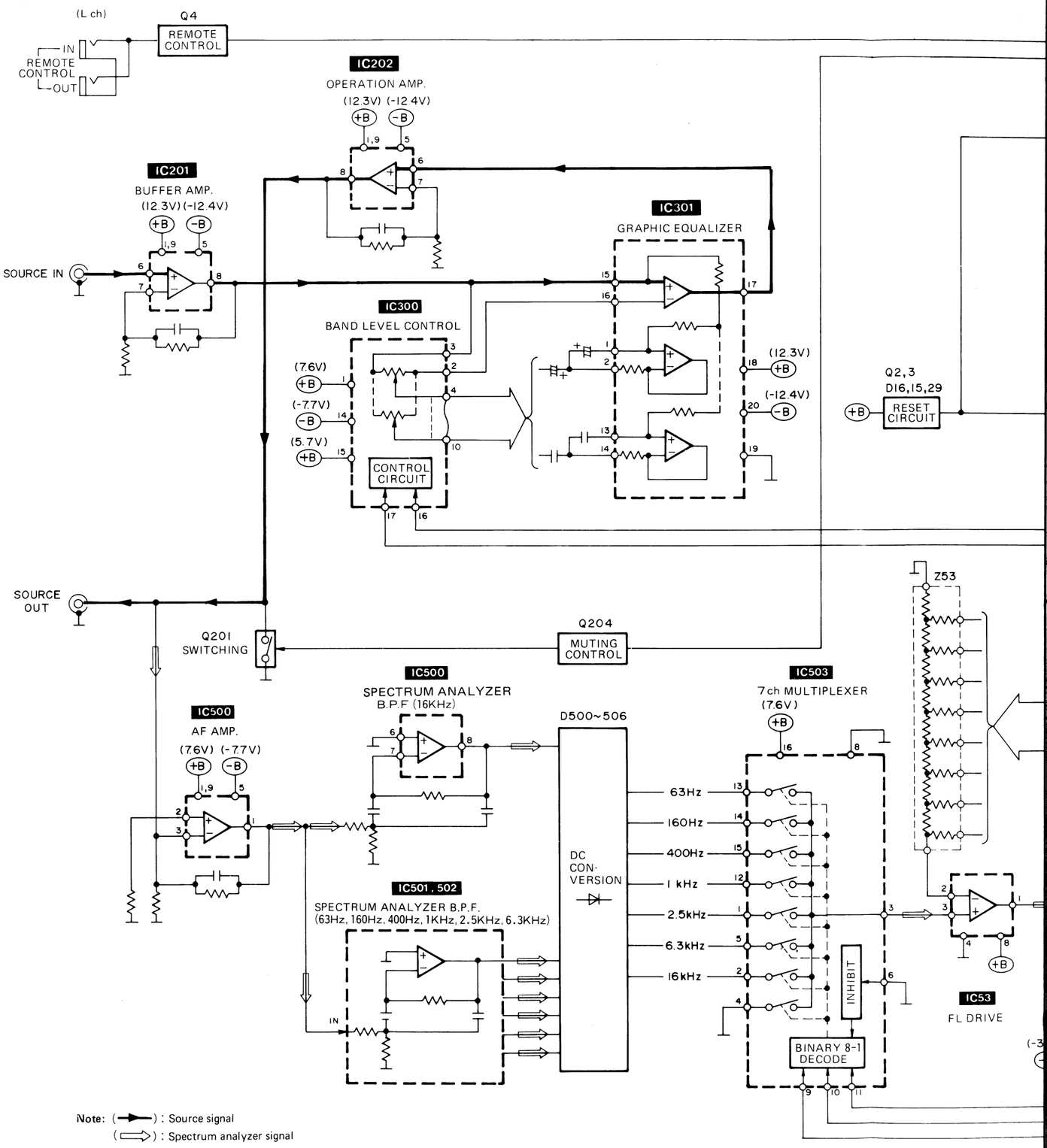
Ref. No. 3	How to remove the main P.C.B.
Procedure 1 →2 →3	1. Remove the 7 screws (❶ ~ ❼) from the main P.C.B. 2. Remove the screw (❽) from the jack plate.



Ref. No. 4	How to remove the switch P.C.B.and EQ level control P.C.B.
Procedure 1 →2 →4	1. Remove the 2 screws (❶ , ❷) from the switch P.C.B. 2. Remove the 12 screws (❸ ~ ⓮) from the EQ level control P.C.B. 3. Undo the 3 tabs and remove the EQ level control P.C.B.

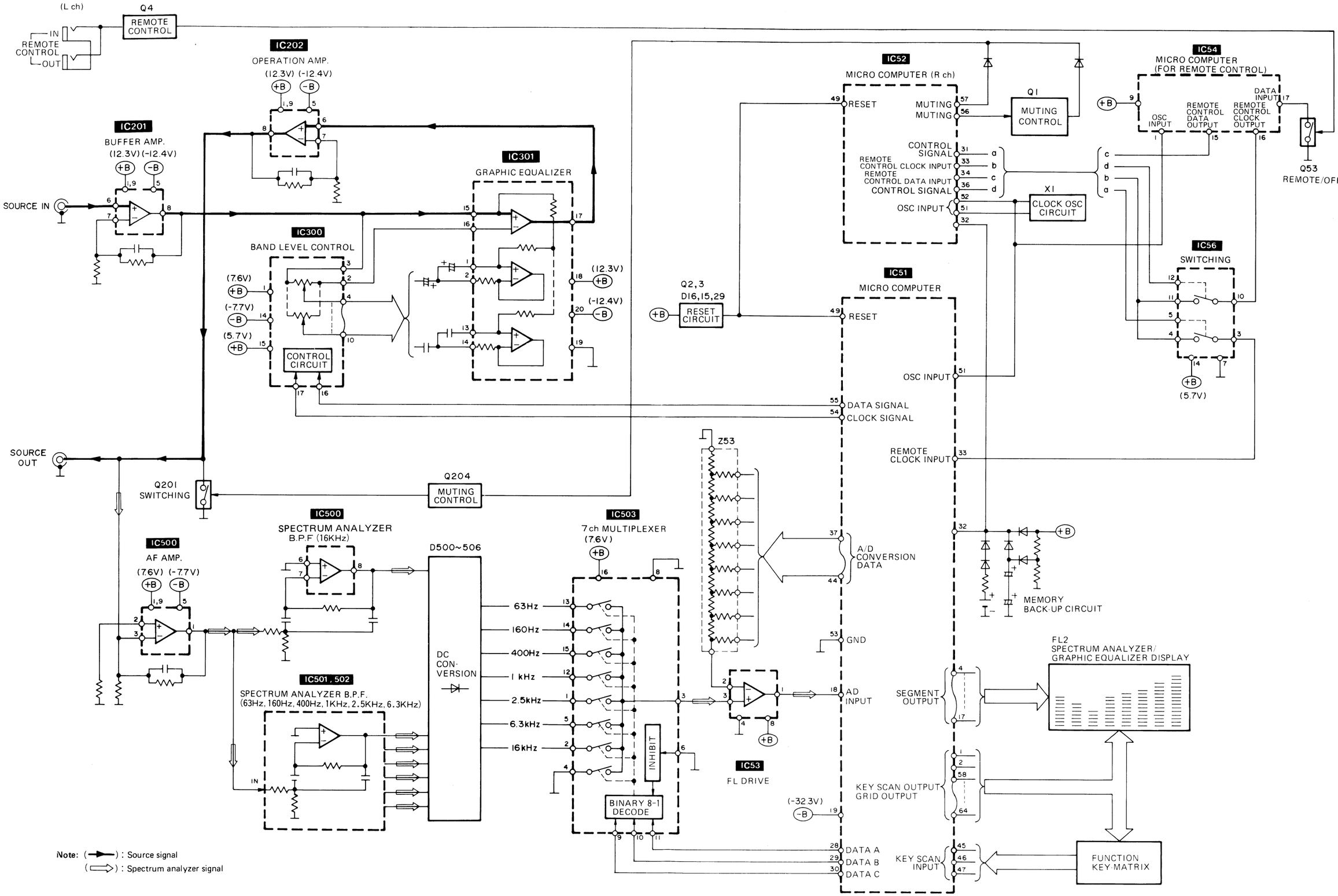


■ BLOCK DIAGRAM



Note: (⟶) : Source signal
(⇨) : Spectrum analyzer signal

■ BLOCK DIAGRAM



■ FUNCTION OF Ic TERMINAL

• Microcomputers IC51 and IC52 (HD614042SG28)

Pin No.	Symbol	Function	
		Input	Output
1	D11	———	FL meter's all-band grid output.
2	D12	———	FL meter's function grid output
3	D13	———	Not used in E70. LED control signal output with E80 H : LED monitor A, L : LED monitor B
4	D14	———	FL meter's scale (+12 ~ −12) segment output when EQ is on.
5	D15	———	−12dB segment output to FL meter.
6	R00	———	+12dB segment output to FL meter.
7	R01	———	+10dB segment output to FL meter.
8	R02	———	+8dB segment output to FL meter.
9	R03	———	+6dB segment output to FL meter.
10	R10	———	+4dB segment output to FL meter.
11	R11	———	+2dB segment output to FL meter.
12	R12	———	0dB segment output to FL meter.
13	R13	———	−2dB segment output to FL meter.
14	R20	———	−4dB segment output to FL meter.
15	R21	———	−6dB segment output to FL meter.
16	R22	———	−8dB segment output to FL meter.
17	R23		−10dB segment output to FL meter.
18	RA0	A/D input, high withstand voltage.	A/D input, high withstand voltage.
19	RA1/Vdisp	Output power supply (−32V) for high withstand voltage terminals (D4 ~ D12, D14, D15, R00 ~ R03, R10 ~ R13, R20 ~ R23).	———
20	R30	Power switch on/off detection. H: on, L: off.	———
21	R31	Model check. H: SH-E80, L: SH-D70	———
22	R32/INT0	Input for external interrupt to MCU. H : Active mode, L : Stop mode.	———
23	R33/INT1	MCU check. H : IC52, L : IC51	———
24	R50	———	Not used in E70. IC200 (TC9162N) DATA control output with E80.
25	R51	———	Not used in E70. IC200 (TC9162N) DATA control output with E80.
26	R52	———	Not used in E70. IC200 (TC9162N) STROBO control output with E80.
27	R53	———	Not used in E70. IC100 (LC4066B) control signal output with E80.
28	R60	———	MPX data A output of IC603 and IC503 (MN4051).
29	R61	———	MPX data B output of IC603 and IC503 (MN4051).
30	R62	———	MPX data C output of IC603 and IC503 (MN4051).
31	R63	———	IC56 (LC4066B) control signal output with E70. LED control signal output with E80.
32	Vcc	5V power supply.	———
33	R40/SCK	IC54 (LC6528C-3189) remote control data. Communication data clock input (Communication available with E70 only).	Communication data clock output with E70 only.
34	R41/S1	IC54 (LC6528C-3189) remote control data. Communication data input (communication available with E70 only).	———

Pin No.	Symbol	Function	
		Input	Output
35	R42/S0	———	Communication data output with E70 only.
36	R43	———	IC56 (LC4066B) control signal output with E70. For E80, H: LED Rec off and L: LED Rec on.
37	R70	———	A/D conversion data bit 0 output.
38	R71	———	A/D conversion data bit 1 output.
39	R72	———	A/D conversion data bit 2 output.
40	R73	———	A/D conversion data bit 3 output.
41	R80	———	A/D conversion data bit 4 output.
42	R81	———	A/D conversion data bit 5 output.
43	R82	———	A/D conversion data bit 6 output.
44	R83	———	A/D conversion data bit 7 output.
45	R90	Input of MEMo key, preset memory 1 ~ 6 key, reverse key, and rec/source key.	———
46	R91	Input of EQ level down key, EQ plus key, and spectrum analyzer/EQ key.	———
47	R92	Input of EQ level up key, flat key, and display mode key.	———
48	R93	———	———
49	RESET	MCU reset. ———	———
50	$\overline{TEST}$	———	———
51	OSC1	Input to internal oscillator.	———
52	OSC2	———	Not used in IC51. Clock output to IC51 with IC52
53	GND	———	Grounding
54	D0	———	IC300/IC400 (LC7522) electronic volume control data output.
55	D1	———	IC300/IC400 (LC7522) electronic volume control data output.
56	D2	———	Muting output at power ON/off. H : Muting off, L : Muting on.
57	D3	———	Muting output to music signal. H : Muting on, L : Muting off.
58	D4	———	FL meter's 63Hz grid output.
59	D5	———	FL meter's 160Hz grid output.
60	D6	———	FL meter's 400Hz grid output.
61	D7	———	FL meter's 1kHz grid output.
62	D8	———	FL meter's 2.5kHz grid output.
63	D9	———	FL meter's 6.3kHz grid output.
64	D10	———	FL meter's 16kHz grid output.

• Microcomp

Pin. No.	Symbo
1	OSC1
2	TEST
3	Vss
4	$\overline{RES}$
5	PA0
6	PA1
7	PA2
8	PA3
9	VDD
10	PC0
11	PC1
12	PC2
13	PC3
14	PD0
15	PD1
16	PD2
17	PD3
18	OSC2

• Electronic

Pin. No.	
1	
2(27)	
3(26)	
4(25) 〈 10(19)	
11(12)	
13	
14	
15	
16	
17	
18	

The pin numbe

output with E80
tor B
nt output when EQ
.
DATA control
DATA control
STROBO control
control signal
503 (MN4051).
503 (MN4051).
503 (MN4051).
ut with E70.
-
ith E70 only.
-

Pin No.	Symbol	Function	
		Input	Output
35	R42/S0	———	Communication data output with E70 only.
36	R43	———	IC56 (LC4066B) control signal output with E70. For E80, H: LED Rec off and L: LED Rec on.
37	R70	———	A/D conversion data bit 0 output.
38	R71	———	A/D conversion data bit 1 output.
39	R72	———	A/D conversion data bit 2 output.
40	R73	———	A/D conversion data bit 3 output.
41	R80	———	A/D conversion data bit 4 output.
42	R81	———	A/D conversion data bit 5 output.
43	R82	———	A/D conversion data bit 6 output.
44	R83	———	A/D conversion data bit 7 output.
45	R90	Input of MEMo key, preset memory 1 ~ 6 key, reverse key, and rec/source key.	———
46	R91	Input of EQ level down key, EQ plus key, and spectrum analyzer/EQ key.	———
47	R92	Input of EQ level up key, flat key, and display mode key.	———
48	R93	———	———
49	RESET	MCU reset. ———	———
50	$\overline{\text{TEST}}$	———	———
51	OSC1	Input to internal oscillator.	———
52	OSC2	———	Not used in IC51. Clock output to IC51 with IC52
53	GND	———	Grounding
54	D0	———	IC300/IC400 (LC7522) electronic volume control data output.
55	D1	———	IC300/IC400 (LC7522) electronic volume control data output.
56	D2	———	Muting output at power ON/off. H : Muting off, L : Muting on.
57	D3	———	Muting output to music signal. H : Muting on, L : Muting off.
58	D4	———	FL meter's 63Hz grid output.
59	D5	———	FL meter's 160Hz grid output.
60	D6	———	FL meter's 400Hz grid output.
61	D7	———	FL meter's 1kHz grid output.
62	D8	———	FL meter's 2.5kHz grid output.
63	D9	———	FL meter's 6.3kHz grid output.
64	D10	———	FL meter's 16kHz grid output.

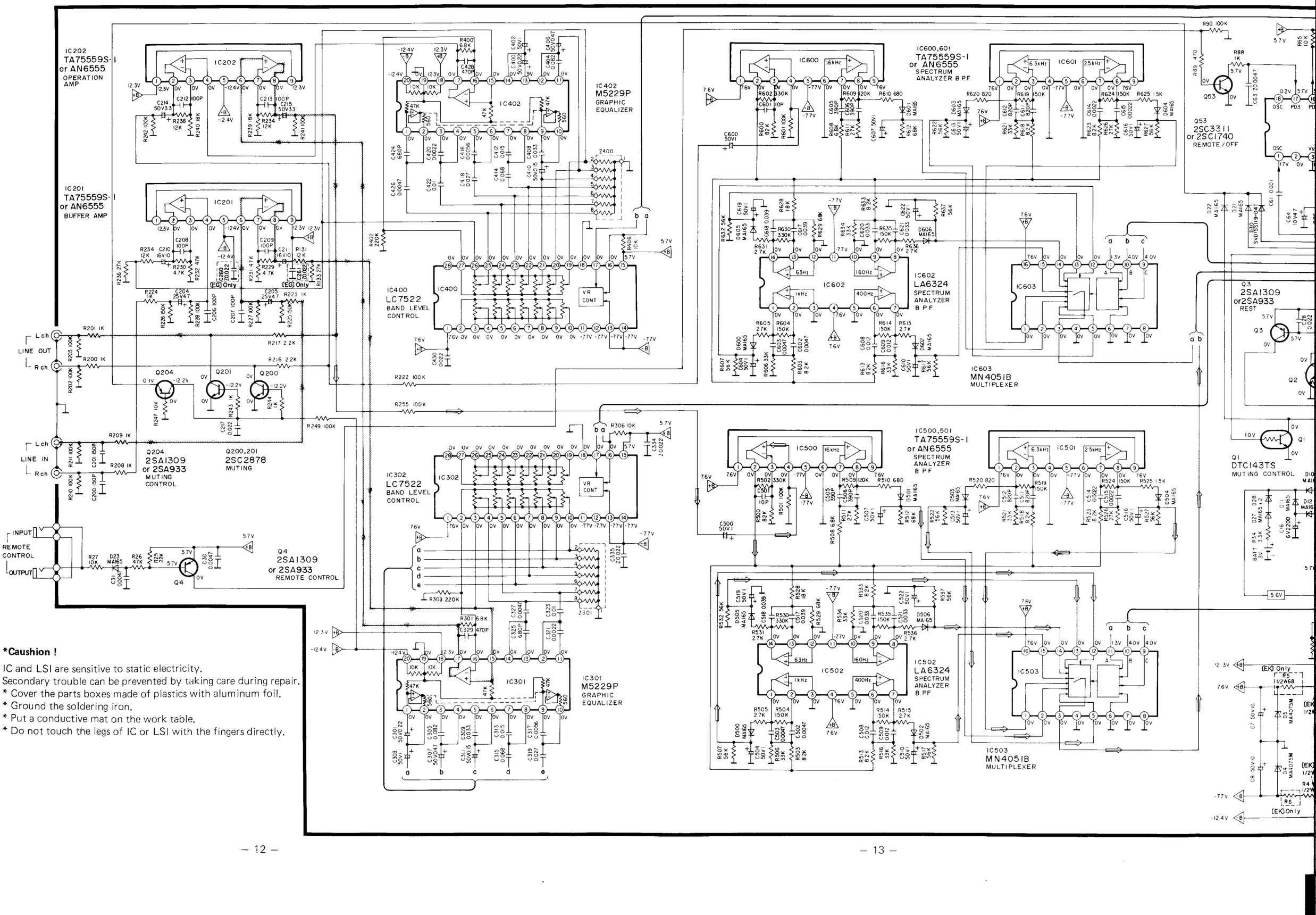
• Microcomputer IC54 (LC6528C–3189)

Pin. No.	Symbol	Function	
		Input	Output
1	OSC1	OSC input.	———
2	TEST	———	———
3	Vss	Grounding.	———
4	$\overline{\text{RES}}$	MCU reset.	———
5	PA0	———	———
6	PA1	———	———
7	PA2	———	———
8	PA3	———	———
9	VDD	5V power supply.	———
10	PC0	———	———
11	PC1	———	———
12	PC2	———	———
13	PC3	———	———
14	PD0	———	———
15	PD1	———	Remote control data output.
16	PD2	———	Remote control data clock output.
17	PD3	Remote control data input.	———
18	OSC2	———	———

• Electronic volume control (IC300 and IC400) (LC7522)

Pin. No.	Symbols	Description
1	VDD	Power supply (for audio signal).
2(27)	IN1	Audio signal input.
3(26)	IN2	Audio signal input.
4(25) ⟩ 10(19)	f_7 ⟩ f_1	Band filter connections.
11(12)	TEST 2 TEST 1	For IC test.
13	S	———
14	VEE	Power supply (for audio signal).
15	VCC	Power supply.
16	D1	Data signal input from microcomputers (IC51, IC52).
17	CLK	Clock signal input from microcomputers (IC51, IC52).
18	VSS	Grounding.

The pin numbers in parentheses are for the right cahnnel.



***Caushion !**

IC and LSI are sensitive to static electricity.
Secondary trouble can be prevented by taking care during repair.

* Cover the parts boxes made of plastics with aluminum foil.
* Ground the soldering iron.
* Put a conductive mat on the work table.
* Do not touch the legs of IC or LSI with the fingers directly.

IC402
M5229P
GRAPHIC
EQUALIZER

IC600,601
TA75559S-I
or AN6555
SPECTRUM
ANALYZER B.P.F.

IC602
LA6324
SPECTRUM
ANALYZER
B.P.F.

IC603
MN4051B
MULTIPLEXER

Q53
2SC3311
or 2SC1740
REMOTE/OFF

IC54
LC6528C-3189
MICRO COMPUTER
(for REMOTE
CONTROL)

Q3
2SA1309
or 2SA933
REST

Q2
DTC114YS
RESET

Q1
DTC143TS
MUTING CONTROL

IC1
ANL78N05
REGULATOR

Q5
2SD1406
REGULATOR

Q6
2SB1015
REGULATOR

IC500,501
TA75559S-I
or AN6555
SPECTRUM
ANALYZER
B.P.F.

IC502
LA6324
SPECTRUM
ANALYZER
B.P.F.

IC503
MN4051B
MULTIPLEXER

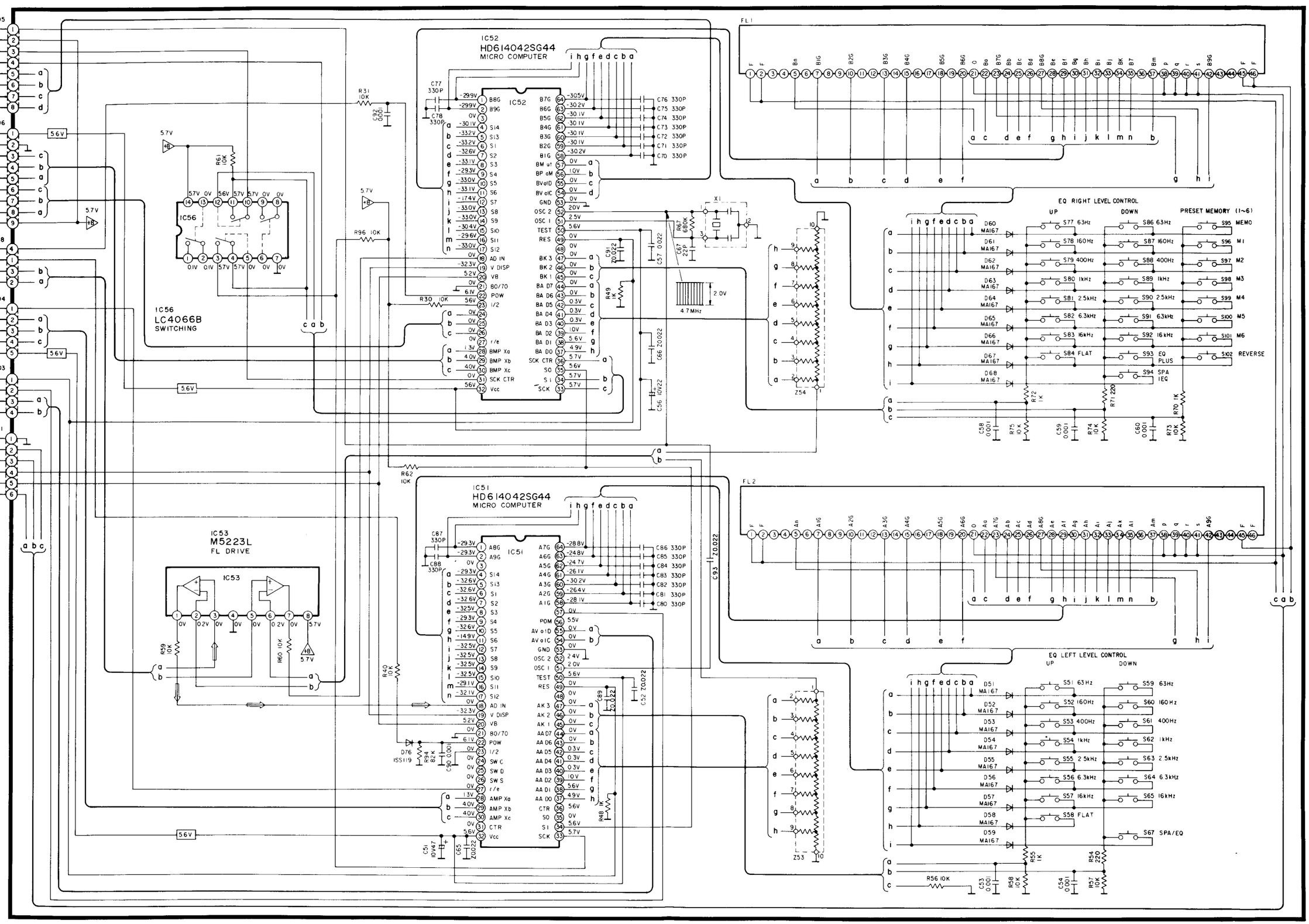
IC301
M5229P
GRAPHIC
EQUALIZER

J105 J106 J108 J104 J103 J101 J102

S1 (POWER)

AC 220V (50/60Hz)

AC OUTLET (UNSWITCHED)



■ SCHEM

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Notes:

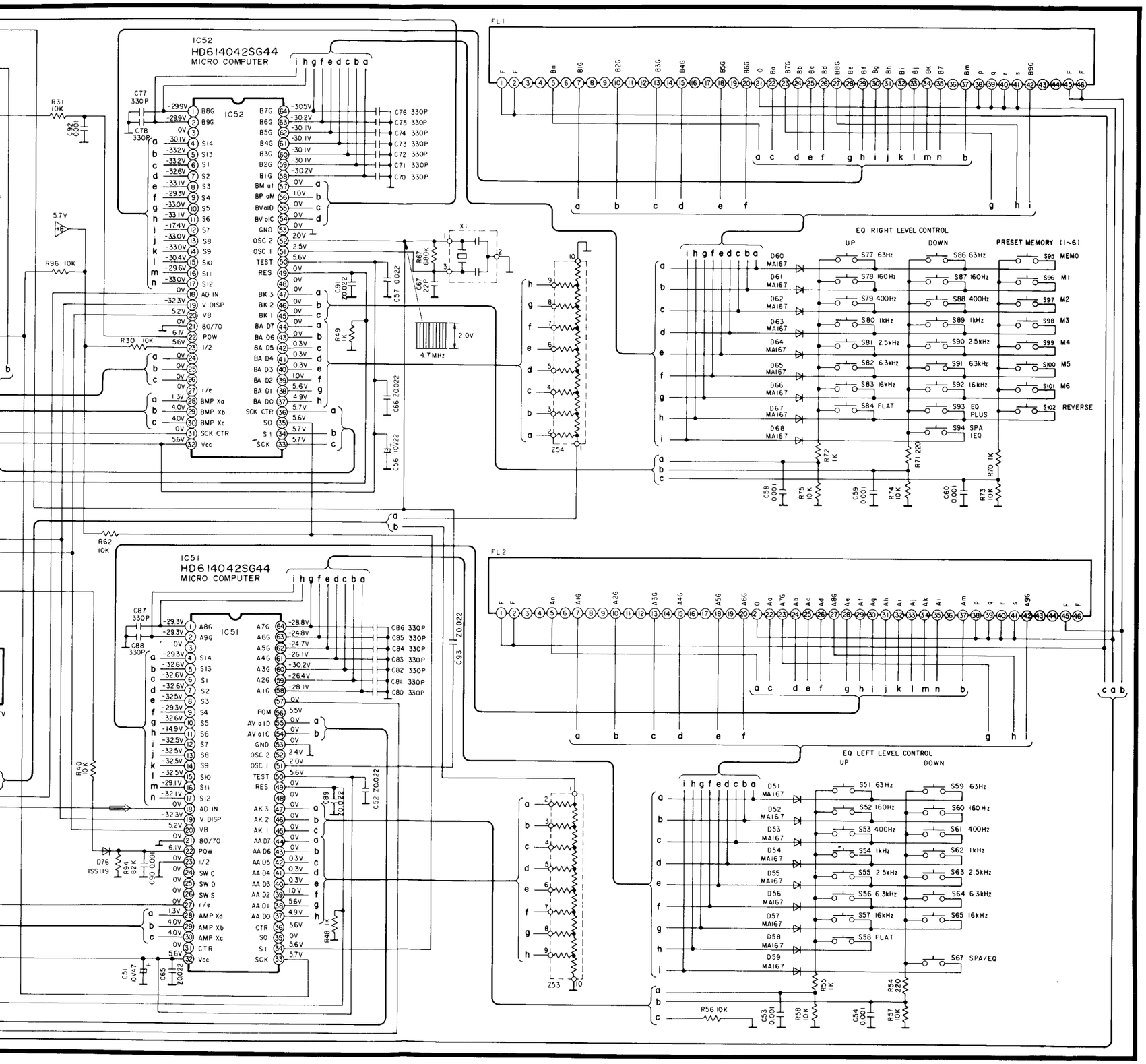
1. S1
2. S51 ~ S57
3. S58
4. S59 ~ S65
5. S67
6. S77 ~ S83
7. S84
8. S86 ~ S92
9. S93
10. S94
11. S95
12. S96 ~ S10
13. S102
14. Indicated
the DC ele
standard.
depending
15. Important
Componer
for safety.
specified p
16.

CAU
This
BR2
Co.,
the
repla

LIT
Pari
sam
Pari
rajä

VAR
Dett
Mat
kom
exal
av e

ADV
Lith
1VC
Husk
lodd



■ SCHEMATIC DIAGRAM

(This schematic diagram may be modified at any time with the development of new technology)

Notes:

1. S1 : Power switch in "on" position.
2. S51 ~ S57 : EQ level "up" controls at each frequency (Lch).
3. S58 : Equalizer mode (EQ on/flat) switch in "off" position(Lch).
4. S59 ~ S65 : EQ level "down" controls at each frequency (Lch).
5. S67 : Display mode (EQ/spectrum) switch in "off" position(Lch).
6. S77 ~ S83 : EQ level "up" controls at each frequency (Rch).
7. S84 : Equalizer mode (EQ on/flat) switch in "off" position (Rch).
8. S86 ~ S92 : EQ level "down" controls at each frequency (Rch0'
9. S93 : Equalizer plus switch in "off" position.
10. S94 : Display mode (EQ/spectrum) switch in "off" position (Rch).
11. S95 : Memory switch in "off" position.
12. S96 ~ S101 : Preset memory switch (memory 1 ~ 6).
13. S102 : Reverse switch in "off" position.
14. Indicated voltage values are the standard values for the unit measured by the DC electronic circuit tester (high-impedance) with the chassis taken as standard. Therefore, there may exist some errors in the voltage values, depending on the internal impedance of the DC circuit tester.
15. Important safety notice:
    Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
16. Source signal
    Spectrum analyzer signal
    +B and −B voltage lines

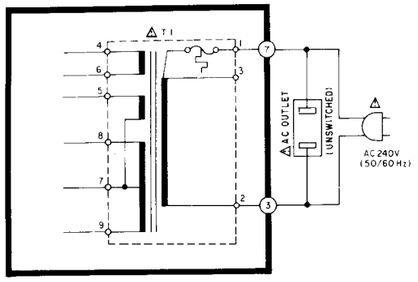
CAUTION:
This lithium battery is a critical component (Type No. BR2325-1VC. Mfrd by Matsushita Battery Industrial Co., Ltd.). Please observe for the proper polarity and the exact location when replacing it and soldering the replacement lithium battery in.

LITIUM PARISTO!
Pariston saa vaihtaa ainoastaan saman valmistajan saman tyyppiseen paristoon.
Pariston virheellisestä käsittelystä syntyy rajähdysvaara.

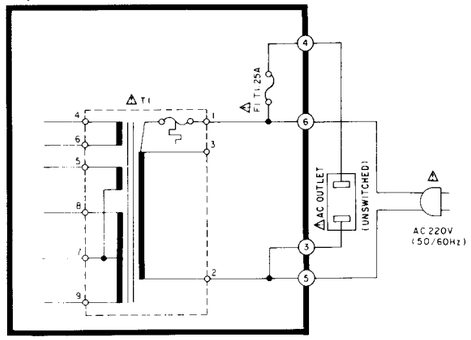
VARNING:
Detta litiumbatteri (av typ Nr. BR2325-1VC,tillverkad av Matsushita Battery Industrial Co., Ltd.) är en kritisk komponent. Var säker om att iaktta korrekt polaritet och exakt läge av litiumbatteriet under ersättning och lödning av ersättningsbatteriet.

ADVARSEL:
Lithiumbatteriet er en vigtig komponent (type nr BR2325-1VC. Fremstillet af Matsushita Battery Industrial Co., Ltd.). Husk rigtig polaritet og placering ved udskiftning og når De lodder det nye lithiumbatteri fast.

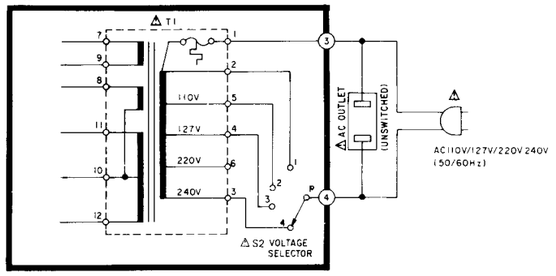
For [EK] area



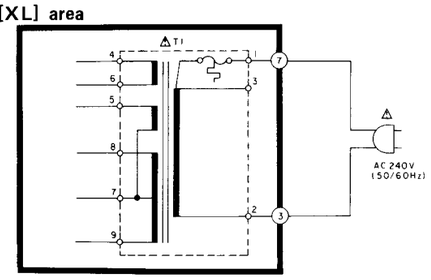
For [EG, EW] areas



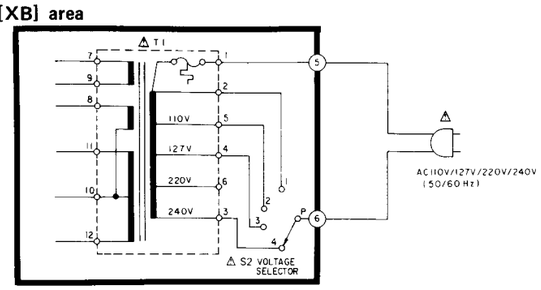
For [XA] area



For [XL] area



For [XB] area



■ RESISTORS & CAPACITORS

Notes: * Important safety notice:
Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.
* Bracketed indications in Ref. No. columns specify the area.
Parts without these indications can be used for all areas.

Numbering System of Resistor

Example

ERD	25	F	J	102
Type	Wattage	Shape	Tolerance	Value
ERX	2	AN	J	471
Type	Wattage	Shape	Tolerance	Value 47x10¹ (ohm)

Numbering System of Capacitor

Example

ECKD	1H	102	Z	F
Type	Voltage	Value	Tolerance	Peculiarity
ECEA	50	M		330
Type	Voltage	Peculiarity		Value (33x10° microfarad)

Resistor Type	Wattage	Tolerance
ERD : Carbon	10 : 1/8W	J : ±5%
ERG : Metal Oxide	12 : 1/2W	F : ±1%
ERX : Metal Film	25 : 1/4W	G : ±2%
ERQ : Fuse Type Metal	1A : 1W	K : ±10%
ERD□ L : Carbon (chip)	18 : 1/8W	
ERQ□ K : Metal Film (chip)	S2 : 1/4W	
ERC : Solid	S1 : 1/2W	
	2F : 1/4W	
	50 : 1/2W	
	2A : 2W	

Capacitor Type	Voltage	Tolerance
ECE : Electrolytic	0J : 6.3V	C : ±0.25pF
ECCD : Ceramic	1A : 10V	J : ±5%
ECKD : Ceramic	1C : 16V	K : ±10%
ECQM : Polyester	1E : 25V	Z : +80% −20%
	1H : 50V	P : +100% −0%
ECQP : Polyproylene	1V : 35V	
	50 : 50V	M : ±20%
ECG : Ceramic	05 : 50V	
ECEA□□□N: Non Polar Electrolytic	2H : 500V	D : ±0.5pF
	2A : 100V	G : ±2%
QCU□ : Ceramic (Chip Type)	1 : 100V	
ECUX : Ceramic (Chip Type)	KC: 400V AC	
ECF : Semiconductor	KC: 125VAC (UL)	
	1J : 63V	
EECW : Liquid electrolyte double layer capcitor		

Ref. No.	Part No.	Part Code
RESISTORS		
R1 D, EH, EB, EF, E1, EW, EG, XL, XA, XB	ERDS1FJ122	001 152 2616 1
R1 EK	ERDS2TJ681	001 152 2449 8
R2 D, EH, EB, EF, E1, EW, EG, XL, XA, XB	ERDS1FJ122	001 152 2616 1
R2 EK	ERDS2TJ681	001 152 2449 8
R3 D, EH, EB, EF, E1, EW, EG, XL, XA, XB	ERDS1FJ151	001 152 2512 8
R3 EK	ERDS1FJ680	001 152 2638 5
R4 D, EH, EB, EF, E1, EW, EG, XL, XA, XB	ERDS1FJ151	001 152 2512 8
R4, R5 EK	ERDS1FJ680	001 152 2638 5
R6 EK	ERDS1FJ680	001 152 2638 5
R7, R8	ERDS2TJ471	001 152 2361 5
R9, R10	ERDS2TJ272	001 152 2354 4
R11	ERDS2TJ331	001 152 2356 2
R12	ERDS2TJ122	001 152 2423 8
R14	ERDS2TJ683	001 152 2450 5
R16, R17	ERDS2TJ332	001 152 2357 1
R25	ERDS2TJ223	001 152 2432 7
R26	ERDS2TJ473	001 152 2363 3
R27	ERDS2TJ103	001 152 2347 3
R28	ERDS2TJ102	001 152 2346 4
R29	ERDS2TJ472	001 152 2362 4
R30, R30	ERDS2TJ103	001 152 2347 3
R31	ERDS2TJ103	001 152 2347 3
R32, R33	ERDS2TJ472	001 152 2362 4
R34	ERDS2TJ332	001 152 2357 1
R35	ERDS2TJ123	001 152 2424 7
R36	ERDS2TJ122	001 152 2423 8
R37	ERDS2TJ103	001 152 2347 3
R38	ERDS2TJ153	001 152 2351 7
R39	ERDS2TJ471	001 152 2361 5
R40	ERDS2TJ103	001 152 2347 3
R48, R49	ERDS2TJ102	001 152 2346 4
R54	ERDS2TJ221	001 152 2431 8
R55	ERDS2TJ102	001 152 2346 4
R56, R57	ERDS2TJ103	001 152 2347 3
R58, R59	ERDS2TJ103	001 152 2347 3
R60, R61	ERDS2TJ103	001 152 2347 3
R62, R64	ERDS2TJ103	001 152 2347 3
R65	ERDS2TJ103	001 152 2347 3
R67	ERDS2TJ684	001 152 2451 4
R70	ERDS2TJ102	001 152 2346 4
R71	ERDS2TJ221	001 152 2431 8
R72	ERDS2TJ102	001 152 2346 4
R73, R74	ERDS2TJ103	001 152 2347 3
R75	ERDS2TJ103	001 152 2347 3
R81, R82	ERDS2TJ104	001 152 2348 2
R83, R84	ERDS2TJ104	001 152 2348 2
R85	ERDS2TJ222	001 152 2353 5
R86	ERDS2TJ223	001 152 2432 7
R87	ERDS2TJ104	001 152 2348 2
R88	ERDS2TJ102	001 152 2346 4
R89	ERDS2TJ471	001 152 2361 5
R90	ERDS2TJ104	001 152 2348 2
R94	ERDS2TJ823	001 152 2456 9
R96, R97	ERDS2TJ103	001 152 2347 3
R98	ERDS2TJ104	001 152 2348 2
R131	ERDS2TJ123	001 152 2424 7
R133	ERDS2TJ273	001 152 2436 3
R160 EK	ERD2FCG680	001 152 0199 5
R161, R162 EK	ERDS2TJ681	001 152 2449 8
R200, R201	ERDS2TJ102	001 152 2346 4
R202, R203	ERDS2TJ104	001 152 2348 2
R208, R209	ERDS2TJ102	001 152 2346 4
R210, R211	ERDS2TJ104	001 152 2348 2
R216, R217	ERDS2TJ222	001 152 2353 5
R222	ERDS2TJ104	001 152 2348 2
R223, R224	ERDS2TJ102	001 152 2346 4
R225, R226	ERDS2TJ154	001 152 2427 4
R227, R228	ERDS2TJ104	001 152 2348 2
R229, R230	ERDS2TJ472	001 152 2362 4
R231, R232	ERDS2TJ473	001 152 2363 3
R234	ERDS2TJ123	001 152 2424 7
R236	ERDS2TJ273	001 152 2436 3
R237, R238	ERDS2TJ123	001 152 2424 7
R239, R240	ERDS2TJ183	001 152 2429 2
R241, R242	ERDS2TJ104	001 152 2348 2
R243, R244	ERDS2TJ102	001 152 2346 4
R247	ERDS2TJ103	001 152 2347 3
R249, R255	ERDS2TJ104	001 152 2348 2
R301	ERDS2TJ682	001 152 2365 1
R303	ERDS2TJ224	001 152 2433 6
R306	ERDS2TJ103	001 152 2347 3
R400	ERDS2TJ682	001 152 2365 1
R402	ERDS2TJ224	001 152 2433 6
R406	ERDS2TJ103	001 152 2347 3
R500	ERDS2TJ823	001 152 2456 9
R501	ERDS2TJ104	001 152 2348 2
R502	ERDS2TJ334	001 152 2438 1
R503	ERDS2TJ822	001 152 2455 0
R504	ERDS2TJ154	001 152 2427 4
R505	ERDS2TJ272	001 152 2354 4
R506	ERDS2TJ333	001 152 2358 0
R507	ERDS2TJ563	001 152 2446 1
R508	ERDS2TJ682	001 152 2365 1
R509	ERDS2TJ124	001 152 2425 6
R510	ERDS2TJ681	001 152 2449 8
R511	ERDS2TJ273	001 152 2436 3
R512	ERDS2TJ683	001 152 2450 5
R513	ERDS2TJ822	001 152 2455 0
R514	ERDS2TJ154	001 152 2427 4
R515	ERDS2TJ272	001 152 2354 4
R516	ERDS2TJ333	001 152 2358 0
R517	ERDS2TJ563	001 152 2446 1
R518	ERDS2TJ822	001 152 2455 0
R519	ERDS2TJ154	001 152 2427 4
R520	ERDS2TJ821	001 152 2454 1
R521	ERDS2TJ333	001 152 2358 0
R522	ERDS2TJ563	001 152 2446 1
R523	ERDS2TJ822	001 152 2455 0
R524	ERDS2TJ154	001 152 2427 4
R525	ERDS2TJ152	001 152 2350 8
R526	ERDS2TJ273	001 152 2436 3
R527	ERDS2TJ563	001 152 2446 1
R528	ERDS2TJ183	001 152 2429 2
R529	ERDS2TJ683	001 152 2450 5
R530	ERDS2TJ334	001 152 2438 1
R531	ERDS2TJ272	001 152 2354 4
R532	ERDS2TJ563	001 152 2446 1
R533	ERDS2TJ822	001 152 2455 0
R534	ERDS2TJ333	001 152 2358 0
R535	ERDS2TJ154	001 152 2427 4
R536	ERDS2TJ272	001 152 2354 4
R537	ERDS2TJ563	001 152 2446 1
R600	ERDS2TJ823	001 152 2456 9
R601	ERDS2TJ104	001 152 2348 2
R602	ERDS2TJ334	001 152 2438 1
R603	ERDS2TJ822	001 152 2455 0
R604	ERDS2TJ154	001 152 2427 4
R605	ERDS2TJ272	001 152 2354 4
R606	ERDS2TJ333	001 152 2358 0
R607	ERDS2TJ563	001 152 2446 1
R608	ERDS2TJ682	001 152 2365 1
R609	ERDS2TJ124	001 152 2425 6
R610	ERDS2TJ681	001 152 2449 8
R611	ERDS2TJ273	001 152 2436 3
R612	ERDS2TJ683	001 152 2450 5
R613	ERDS2TJ822	001 152 2455 0
R614	ERDS2TJ154	001 152 2427 4
R615	ERDS2TJ272	001 152 2354 4
R616	ERDS2TJ333	001 152 2358 0
R617	ERDS2TJ563	001 152 2446 1
R618	ERDS2TJ822	001 152 2455 0
R619	ERDS2TJ154	001 152 2427 4
R620	ERDS2TJ821	001 152 2454 1
R621	ERDS2TJ333	001 152 2358 0
R622	ERDS2TJ563	001 152 2446 1
R623	ERDS2TJ822	001 152 2455 0
R624	ERDS2TJ154	001 152 2427 4
R625	ERDS2TJ152	001 152 2350 8
R626	ERDS2TJ273	001 152 2436 3
R627	ERDS2TJ563	001 152 2446 1
R628	ERDS2TJ183	001 152 2429 2
R629	ERDS2TJ683	001 152 2450 5
R630	ERDS2TJ334	001 152 2438 1
R631	ERDS2TJ272	001 152 2354 4
R632	ERDS2TJ563	001 152 2446 1
R633	ERDS2TJ822	001 152 2455 0
R634	ERDS2TJ333	001 152 2358 0
R635	ERDS2TJ154	001 152 2427 4
R636	ERDS2TJ272	001 152 2354 4
R637	ERDS2TJ563	001 152 2446 1
CAPACITORS		
23	SHRK936	016 652 0778 8
24	SHRK937	016 652 0779 7
C1, C2 ⚠	ECKD1H223PF	001 103 1510 9
C3, C4	ECEA1EU221	001 120 2838 7
C5, C6	ECEA1HU100	001 120 3251 4
C7, C8	ECEA1HU100	001 120 3251 4
C9	ECKD	
C10	ECEA	
C11	ECKD	
C12	ECEA	
C13	ECKD	
C16	ECEA	
C18	ECKD	
C19	ECEA	
C20	ECKD	
C21	ECEA	
C26	ECEA	
C27	ECEA	
C28	ECFT	
C30, C31	ECFT	
C33, C34	ECKD	
D, EH, EB, EF, E1, EW, EG, XL, XA, XB		
C35	ECKD	
C36	ECEA	
C37, C38	ECBT	
C51	ECEA	
C52	ECBT	
C53, C54	ECBT	
C56	ECEA	
C57	ECBT	
C58, C59	ECBT	
C60	ECBT	
C61	ECFT	
C63	ECFT	
C64	ECEA	
C65, C66	ECBT	
C67	ECBT	
C70, C71	ECBT	
C72, C73	ECBT	
C74, C75	ECBT	
C76, C77	ECBT	
C78, C80	ECBT	
C81, C82	ECBT	
C83, C84	ECBT	
C85, C86	ECBT	
C87, C88	ECBT	
C89	ECBT	
C90	ECBT	
C91	ECBT	
C92	ECBT	
C93	ECBT	
C200, C201	ECCD	
C204, C205	ECEA	
C206, C207	ECCD	
C208, C209	ECCD	
C210, C211	ECEA	
C212, C213	ECCD	
C214, C215	ECEA	
C217	ECKD	
C260, C261 EG	ECBT	
C301	ECEA	
C303	ECEA	
C305	ECFT	

■ RESISTORS & CAPACITORS

Notes: * Important safety notice:
Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.
* Bracketed indications in Ref. No. columns specify the area.
Parts without these indications can be used for all areas.

Numbering System of Resistor

Example

ERD	25	F	J	102
Type	Wattage	Shape	Tolerance	Value

ERX	2	AN	J	471
Type	Wattage	Shape	Tolerance	Value

47x10¹ (ohm)

Numbering System of Capacitor

Example

ECKD	1H	102	Z	F
Type	Voltage	Value	Tolerance	Peculiarity

ECEA	50	M	330
Type	Voltage	Peculiarity	Value

(33x10⁰ microfarad)

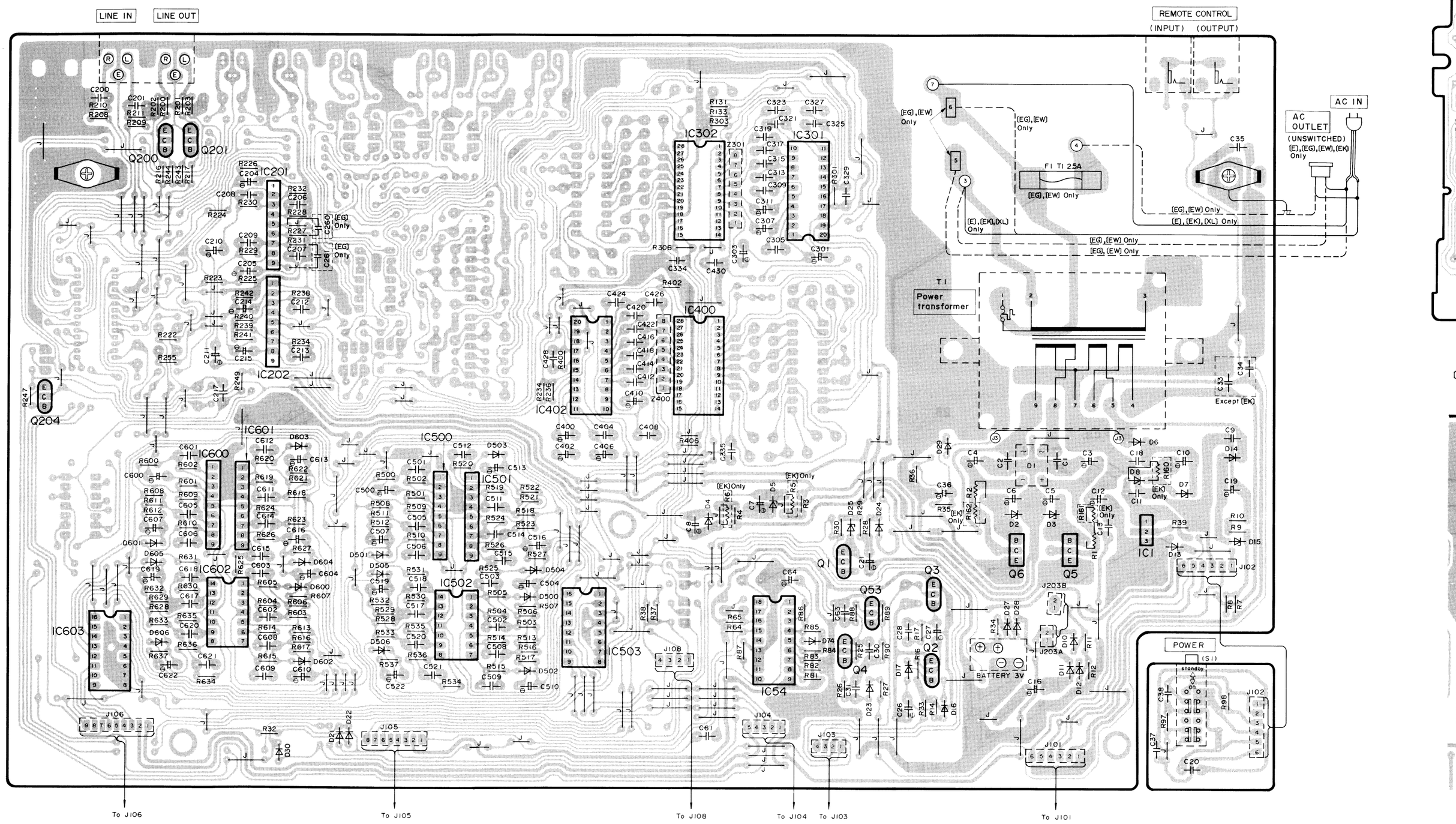
Resistor Type	Wattage	Tolerance
ERD : Carbon ERG : Metal Oxide ERX : Metal Film ERQ : Fuse Type Metal ERD□□ L : Carbon (chip) ERQ□□ K : Metal Film (chip) ERC : Solid	10 : 1/8W 12 : 1/2W 25 : 1/4W 1A : 1W 18 : 1/8W S2 : 1/4W S1 : 1/2W 2F : 1/4W 50 : 1/2W 2A : 2W	J : ±5% F : ±1% G : ±2% K : ±10%

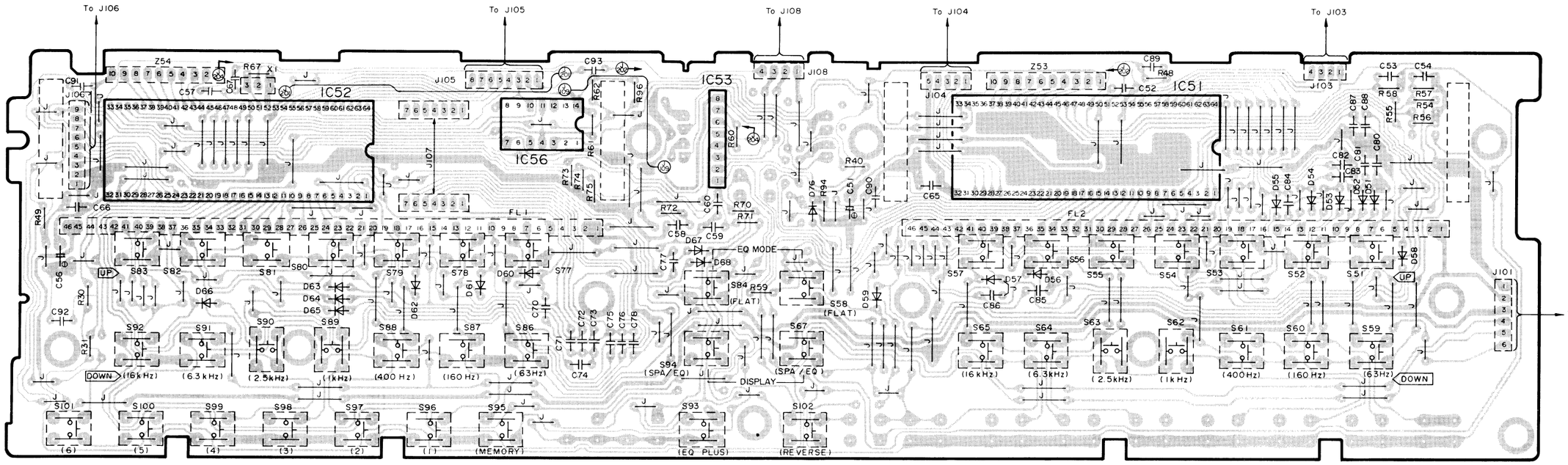
Capacitor Type	Voltage	Tolerance
ECE : Electrolytic ECCD : Ceramic ECKD : Ceramic ECQM : Polyester ECQP : Polyproylene ECG : Ceramic ECEA□□□N: Non Polar Electrolytic QCU□ : Ceramic (Chip Type) ECUX : Ceramic (Chip Type) ECF : Semiconductor EECW : Liquid electrolyte double layer capcitor	0J : 6.3V 1A : 10V 1C : 16V 1E : 25V 1H : 50V 1V : 35V 50 : 50V 05 : 50V 2H : 500V 2A : 100V 1 : 100V KC: 400V AC KC: 125VAC (UL) 1J : 63V	C : ±0.25pF J : ±5% K : ±10% Z : +80% −20% P : +100% −0% M : ±20% D : ±0.5pF G : ±2%

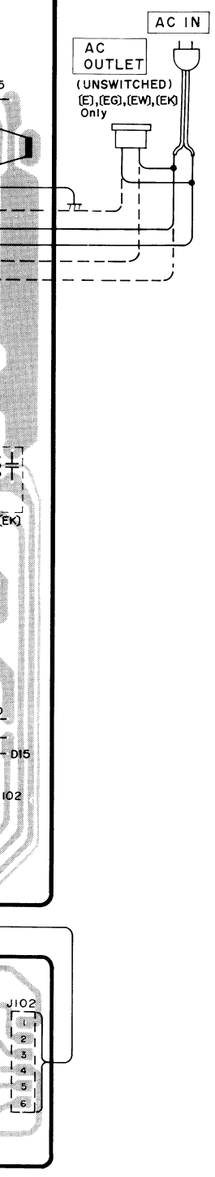
Ref. No.	Part No.	Part Code
RESISTORS		
R1 D, EH, EB, EF, E1, EW, EG, XL, XA, XB	ERDS1FJ122	001 152 2616 1
R1 EK	ERDS2TJ681	001 152 2449 8
R2 D, EH, EB, EF, E1, EW, EG, XL, XA, XB	ERDS1FJ122	001 152 2616 1
R2 EK	ERDS2TJ681	001 152 2449 8
R3 D, EH, EB, EF, E1, EW, EG, XL, XA, XB	ERDS1FJ151	001 152 2512 8
R3 EK	ERDS1FJ680	001 152 2638 5
R4 D, EH, EB, EF, E1, EW, EG, XL, XA, XB	ERDS1FJ151	001 152 2512 8
R4, R5 EK	ERDS1FJ680	001 152 2638 5
R6 EK	ERDS1FJ680	001 152 2638 5
R7, R8	ERDS2TJ471	001 152 2361 5
R9, R10	ERDS2TJ272	001 152 2354 4
R11	ERDS2TJ331	001 152 2356 2
R12	ERDS2TJ122	001 152 2423 8
R14	ERDS2TJ683	001 152 2450 5
R16, R17	ERDS2TJ332	001 152 2357 1
R25	ERDS2TJ223	001 152 2432 7
R26	ERDS2TJ473	001 152 2363 3
R27	ERDS2TJ103	001 152 2347 3
R28	ERDS2TJ102	001 152 2346 4
R29	ERDS2TJ472	001 152 2362 4
R30, R30	ERDS2TJ103	001 152 2347 3
R31	ERDS2TJ103	001 152 2347 3
R32, R33	ERDS2TJ472	001 152 2362 4
R34	ERDS2TJ332	001 152 2357 1
R35	ERDS2TJ123	001 152 2424 7
R36	ERDS2TJ122	001 152 2423 8
R37	ERDS2TJ103	001 152 2347 3
R38	ERDS2TJ153	001 152 2351 7
R39	ERDS2TJ471	001 152 2361 5
R40	ERDS2TJ103	001 152 2347 3
R48, R49	ERDS2TJ102	001 152 2346 4
R54	ERDS2TJ221	001 152 2431 8
R55	ERDS2TJ102	001 152 2346 4
R56, R57	ERDS2TJ103	001 152 2347 3
R58, R59	ERDS2TJ103	001 152 2347 3
R60, R61	ERDS2TJ103	001 152 2347 3
R62, R64	ERDS2TJ103	001 152 2347 3
R65	ERDS2TJ103	001 152 2347 3
R67	ERDS2TJ684	001 152 2451 4
R70	ERDS2TJ102	001 152 2346 4
R71	ERDS2TJ221	001 152 2431 8
R72	ERDS2TJ102	001 152 2346 4
R73, R74	ERDS2TJ103	001 152 2347 3
R75	ERDS2TJ103	001 152 2347 3
R81, R82	ERDS2TJ104	001 152 2348 2
R83, R84	ERDS2TJ104	001 152 2348 2
R85	ERDS2TJ222	001 152 2353 5
R86	ERDS2TJ223	001 152 2432 7
R87	ERDS2TJ104	001 152 2348 2
R88	ERDS2TJ102	001 152 2346 4
R89	ERDS2TJ471	001 152 2361 5
R90	ERDS2TJ104	001 152 2348 2
R94	ERDS2TJ823	001 152 2456 9
R96, R97	ERDS2TJ103	001 152 2347 3
R98	ERDS2TJ104	001 152 2348 2
R131	ERDS2TJ123	001 152 2424 7
R133	ERDS2TJ273	001 152 2436 3
R160 EK	ERD2FCG680	001 152 0199 5
R161, R162 EK	ERDS2TJ681	001 152 2449 8
R200, R201	ERDS2TJ102	001 152 2346 4
R202, R203	ERDS2TJ104	001 152 2348 2
R208, R209	ERDS2TJ102	001 152 2346 4
R210, R211	ERDS2TJ104	001 152 2348 2
R216, R217	ERDS2TJ222	001 152 2353 5
R222	ERDS2TJ104	001 152 2348 2
R223, R224	ERDS2TJ102	001 152 2346 4
R225, R226	ERDS2TJ154	001 152 2427 4
R227, R228	ERDS2TJ104	001 152 2348 2
R229, R230	ERDS2TJ472	001 152 2362 4
R231, R232	ERDS2TJ473	001 152 2363 3
R234	ERDS2TJ123	001 152 2424 7
R236	ERDS2TJ273	001 152 2436 3
R237, R238	ERDS2TJ123	001 152 2424 7
R239, R240	ERDS2TJ183	001 152 2429 2
R241, R242	ERDS2TJ104	001 152 2348 2
R243, R244	ERDS2TJ102	001 152 2346 4
R247	ERDS2TJ103	001 152 2347 3
R249, R255	ERDS2TJ104	001 152 2348 2
R301	ERDS2TJ682	001 152 2365 1
R303	ERDS2TJ224	001 152 2433 6
R306	ERDS2TJ103	001 152 2347 3
R400	ERDS2TJ682	001 152 2365 1
R402	ERDS2TJ224	001 152 2433 6
R406	ERDS2TJ103	001 152 2347 3
R500	ERDS2TJ823	001 152 2456 9
R501	ERDS2TJ104	001 152 2348 2
R502	ERDS2TJ334	001 152 2438 1
R503	ERDS2TJ822	001 152 2455 0
R504	ERDS2TJ154	001 152 2427 4
R505	ERDS2TJ272	001 152 2354 4
R506	ERDS2TJ333	001 152 2358 0
R507	ERDS2TJ563	001 152 2446 1
R508	ERDS2TJ682	001 152 2365 1
R509	ERDS2TJ124	001 152 2425 6
R510	ERDS2TJ681	001 152 2449 8
R511	ERDS2TJ273	001 152 2436 3
R512	ERDS2TJ683	001 152 2450 5
R513	ERDS2TJ822	001 152 2455 0
R514	ERDS2TJ154	001 152 2427 4
R515	ERDS2TJ272	001 152 2354 4
R516	ERDS2TJ333	001 152 2358 0
R517	ERDS2TJ563	001 152 2446 1
R518	ERDS2TJ822	001 152 2455 0
R519	ERDS2TJ154	001 152 2427 4
R520	ERDS2TJ821	001 152 2454 1
R521	ERDS2TJ333	001 152 2358 0
R522	ERDS2TJ563	001 152 2446 1
R523	ERDS2TJ822	001 152 2455 0

Ref. No.	Part No.	Part Code
R524	ERDS2TJ154	001 152 2427 4
R525	ERDS2TJ152	001 152 2350 8
R526	ERDS2TJ273	001 152 2436 3
R527	ERDS2TJ563	001 152 2446 1
R528	ERDS2TJ183	001 152 2429 2
R529	ERDS2TJ683	001 152 2450 5
R530	ERDS2TJ334	001 152 2438 1
R531	ERDS2TJ272	001 152 2354 4
R532	ERDS2TJ563	001 152 2446 1
R533	ERDS2TJ822	001 152 2455 0
R534	ERDS2TJ333	001 152 2358 0
R535	ERDS2TJ154	001 152 2427 4
R536	ERDS2TJ272	001 152 2354 4
R537	ERDS2TJ563	001 152 2446 1
R600	ERDS2TJ823	001 152 2456 9
R601	ERDS2TJ104	001 152 2348 2
R602	ERDS2TJ334	001 152 2438 1
R603	ERDS2TJ822	001 152 2455 0
R604	ERDS2TJ154	001 152 2427 4
R605	ERDS2TJ272	001 152 2354 4
R606	ERDS2TJ333	001 152 2358 0
R607	ERDS2TJ563	001 152 2446 1
R608	ERDS2TJ682	001 152 2365 1
R609	ERDS2TJ124	001 152 2425 6
R610	ERDS2TJ681	001 152 2449 8
R611	ERDS2TJ273	001 152 2436 3
R612	ERDS2TJ683	001 152 2450 5
R613	ERDS2TJ822	001 152 2455 0
R614	ERDS2TJ154	001 152 2427 4
R615	ERDS2TJ272	001 152 2354 4
R616	ERDS2TJ333	001 152 2358 0
R617	ERDS2TJ563	001 152 2446 1
R618	ERDS2TJ822	001 152 2455 0
R619	ERDS2TJ154	001 152 2427 4
R620	ERDS2TJ821	001 152 2454 1
R621	ERDS2TJ333	001 152 2358 0
R622	ERDS2TJ563	001 152 2446 1
R623	ERDS2TJ822	001 152 2455 0
R624	ERDS2TJ154	001 152 2427 4
R625	ERDS2TJ152	001 152 2350 8
R626	ERDS2TJ273	001 152 2436 3
R627	ERDS2TJ563	001 152 2446 1
R628	ERDS2TJ183	001 152 2429 2
R629	ERDS2TJ683	001 152 2450 5
R630	ERDS2TJ334	001 152 2438 1
R631	ERDS2TJ272	001 152 2354 4
R632	ERDS2TJ563	001 152 2446 1
R633	ERDS2TJ822	001 152 2455 0
R634	ERDS2TJ333	001 152 2358 0
R635	ERDS2TJ154	001 152 2427 4
R636	ERDS2TJ272	001 152 2354 4
R637	ERDS2TJ563	001 152 2446 1
CAPACITORS		
23	SHRK936	016 652 0778 8
24	SHRK937	016 652 0779 7
C1 C2 ⚠	ECKD1H223PF	001 103 1510 9
C3, C4	ECEA1EU221	001 120 2838 7
C5, C6	ECEA1HU100	001 120 3251 4
C7, C8	ECEA1HU100	001 120 3251 4
C9	ECKD1H223PF	001 103 1510 9
C10	ECEA1HU221	001 120 3833 8
C11	ECKD1H223PF	001 103 1510 9
C12	ECEA1HU100	001 120 3251 4
C13	ECKD1H223PF	001 103 1510 9
C16	ECEA0JU222	001 120 3161 5
C18	ECKD1H223PF	001 103 1510 9
C19	ECEA1HU221	001 120 3833 8
C20	ECKD1H223PF	001 103 1510 9
C21	ECEA1HK4R7	001 120 2640 9
C26	ECEA1HK010	001 120 0341 5
C27	ECEA1HK4R7	001 120 2640 9
C28	ECFTD223KXL	001 108 0342 6
C30, C31	ECFTD472KXL	001 108 0746 0
C33, C34	ECKD1H103PF	001 103 1449 7
D, EH, EB, EF, E1, EW, EG, XL, XA, XB		
C35	ECKD1H223PF	001 103 1510 9
C36	ECEA1HK2R2B	001 120 0346 0
C37, C38	ECBT1E223ZF	001 103 7589 2
C51	ECEA6M47R	001 120 0446 7
C52	ECBT1E223ZF	001 103 7589 2
C53, C54	ECBT1H102KB	001 103 5026 0
C56	ECEA10M22	001 120 5072 7
C57	ECBT1E223ZF	001 103 7589 2
C58, C59	ECBT1H102KB	001 103 5026 0
C60	ECBT1H102KB	001 103 5026 0
C61	ECFTD102KXL	001 108 0371 1
C63	ECFTD472KXL	001 108 0746 0
C64	ECEA1AK470	001 120 0181 3
C65, C66	ECBT1E223ZF	001 103 7589 2
C67	ECBT1H220KB	001 103 9324 7
C70, C71	ECBT1H331KBY	001 103 3732 9
C72, C73	ECBT1H331KBY	001 103 3732 9
C74, C75	ECBT1H331KBY	001 103 3732 9
C76, C77	ECBT1H331KBY	001 103 3732 9
C78, C80	ECBT1H331KBY	001 103 3732 9
C81, C82	ECBT1H331KBY	001 103 3732 9
C83, C84	ECBT1H331KBY	001 103 3732 9
C85, C86	ECBT1H331KBY	001 103 3732 9
C87, C88	ECBT1H331KBY	001 103 3732 9
C89	ECBT1E223ZF	001 103 7589 2
C90	ECBT1H102KB	001 103 5026 0
C91	ECBT1E223ZF	001 103 7589 2
C92	ECBT1H102KB	001 103 5026 0
C93	ECBT1E223ZF	001 103 7589 2
C200, C201	ECCD1H151K	001 103 0429 5
C204, C205	ECEA1EK4R7	001 120 0294 5
C206, C207	ECCD1H101K	001 103 0341 2
C208, C209	ECCD1H101K	001 103 0341 2
C210, C211	ECEA1CKS100	001 120 2600 7
C212, C213	ECCD1H101K	001 103 0341 2
C214, C215	ECEA1HK3R3	001 120 0349 7
C217	ECKD1H223PF	001 103 1510 9
C260, C261 EG	ECBT1E223ZF	001 103 7589 2
C301	ECEA1HKR22	001 120 0336 2
C303	ECEA1HK010	001 120 0341 5
C305	ECFTD823KXL	001 108 0364 0
C307	ECEA1HKR47	001 120 0338 0
C309	ECFTD333KXL	001 108 0360 4
C311	ECEA1HKR15	001 120 5657 8
C313	ECFTD153KXL	001 108 0356 0
C315	ECFTD683KXL	001 108 0346 2
C317	ECFTD562KXL	001 108 0904 4
C319	ECFTD273KXL	001 108 0343 5
C321	ECFTD222KXL	001 108 0349 9
C323	ECFTD103KXL	001 108 0341 7
C325	ECKD1H681K	001 103 1580 5
C327	ECFTD472KXL	001 108 0746 0
C329	ECKD1H471KB	001 103 1551 0
C334, C335	ECKD1H223PF	001 103 1510 9
C400	ECEA1HKR22	001 120 0336 2
C402	ECEA1HK010	001 120 0341 5
C404	ECFTD823KXL	001 108 0364 0
C406	ECEA1HKR47	001 120 0338 0
C408	ECFTD333KXL	001 108 0360 4
C410	ECEA1HKR15	001 120 5657 8
C412	ECFTD153KXL	001 108 0356 0
C414	ECFTD683KXL	001 108 0346 2
C416	ECFTD562KXL	001 108 0904 4
C418	ECFTD273KXL	001 108 0343 5
C420	ECFTD222KXL	001 108 0349 9
C422	ECFTD103KXL	001 108 0341 7
C424	ECKD1H681K	001 103 1580 5
C426	ECFTD472KXL	001 108 0746 0
C428	ECKD1H471KB	001 103 1551 0
C430	ECKD1H223PF	001 103 1510 9
C500	ECEA1HK010	001 120 0341 5
C501	ECCD1H100KC	001 103 0321 6
C502, C503	ECFTD472KXL	001 108 0746 0
C504	ECEA1HK010	001 120 0341 5
C505, C506	ECKD1H391KB	001 103 1544 9
C507	ECEA1HK010	001 120 0341 5
C508, C509	ECFTD123KXL	001 108 0745 1
C510	ECEA1HK010	001 120 0341 5
C511, C512	ECKD1H821KB	001 103 1596 7
C513	ECEA1HK010	001 120 0341 5
C514, C515	ECFTD222KXL	001 108 0349 9
C516	ECEA1HK010	001 120 0341 5
C517, C518	ECFTD393KXL	001 108 0817 2
C519	ECEA1HK010	001 120 0341 5
C520, C521	ECFTD333KXL	001 108 0360 4
C522, C600	ECEA1HK010	001 120 0341 5
C601	ECCD1H100KC	001 103 0321 6
C602, C603	ECFTD472KXL	001 108 0746 0
C604	ECEA1HK010	001 120 0341 5
C605, C606	ECKD1H391KB	001 103 1544 9
C607	ECEA1HK010	001 120 0341 5
C608, C609	ECFTD123KXL	001 108 0745 1
C610	ECEA1HK010	001 120 0341 5
C611, C612	ECKD1H821KB	001 103 1596 7
C613	ECEA1HK010	001 120 0341 5
C614, C615	ECFTD222KXL	001 108 0349 9
C616	ECEA1HK010	001 120 0341 5
C617, C618	ECFTD393KXL	001 108 0817 2
C619	ECEA1HK010	001 120 0341 5
C620, C621	ECFTD333KXL	001 108 0360 4
C622	ECEA1HK010	001 120 0341 5

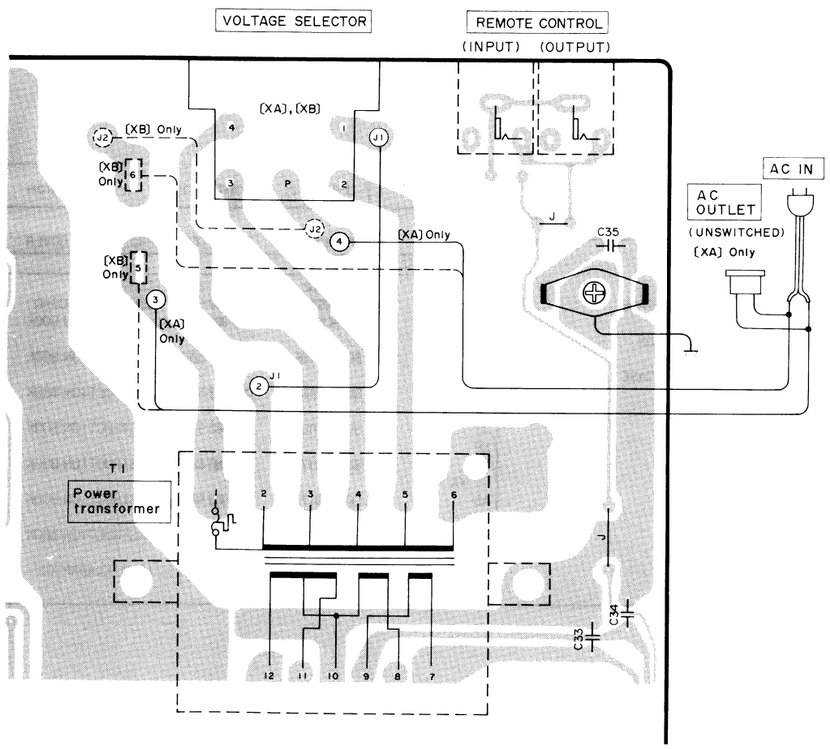
■ PROTECTION CIRCUITRY



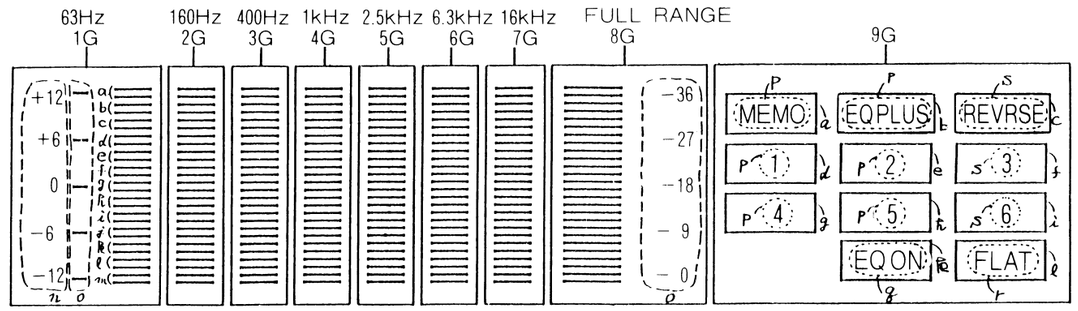




(XA),(XB) Only



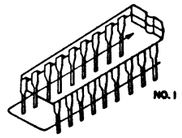
■ PIN DESCRIPTION OF FL DISPLAY TUBE



F; Filament, 1G ~ 13G; Grids, a ~ z; Segments, NP; Empty pins

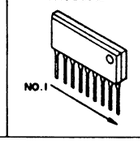
Pin No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46
Pin name	F1	F1	NP	NP	n	NP	1G	NP	NP	2G	NP	NP	3G	NP	4G	NP	NP	5G	NP	6G	o	a	7G	b	c	d	8G	e	f	g	h	i	j	k	ℓ	NP	m	p	q	r	s	9G	NP	NP	F2	F2

• Terminal guide of IC's, Transistors and Diodes

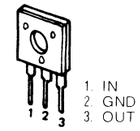


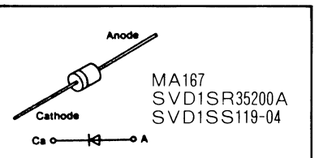
LC4066B	14Pin	M5229P	20Pin
LA6324	14Pin	LC7522	28Pin
MN4051B	16Pin	HD614042SG28	64Pin
LC8528C-3189	18Pin		

M5223L



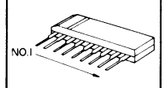
AN78N05



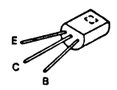


MA167
SVD1SR35200A
SVD1SS119-04

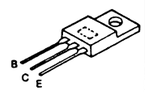
SVITA75559S

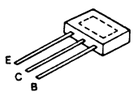


2SC2878A



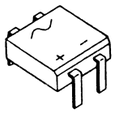
2SB1015-Y
2SD1406-Y

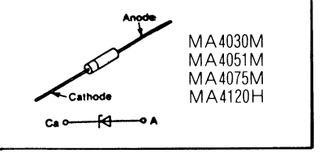




2SC3311-Q
2SA1309QRS
DTC143TSTP
DTC114YSTP

SVD1B4B42





MA4030M
MA4051M
MA4075M
MA4120H

■ REPLACEMENT PARTS LIST

Notes: * Important safety notice:
Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.
* Bracketed indications in Ref. No. columns specify the area.
Parts without these indications can be used for all areas.

Ref. No.	Part No.	Part Code	Description
INTEGRATED CIRCUITS			
IC1	AN78N05	001 060 5355 2	I.C.
IC51, IC52	HD614042SG44	001 061 5034 1	I.C.
IC53	M5223L	001 061 0194 6	I.C.
IC54	LC6528C-3189	001 061 3228 1	I.C.
IC56	LC4066B	001 060 8667 7	I.C.
IC201, IC202	SVITA75559S	001 060 4281 7	I.C.
IC300	LC7522	001 060 8404 8	I.C.
IC301	M5229P	001 061 0195 5	I.C.
IC400	LC7522	001 060 8404 8	I.C.
IC402	M5229P	001 061 0195 5	I.C.
IC500, IC501	SVITA75559S	001 060 4281 7	I.C.
IC502	LA6324	001 061 0191 9	I.C.
IC503	MN4051B	001 060 6963 0	I.C.
IC600, IC601	SVITA75559S	001 060 4281 7	I.C.
IC602	LA6324	001 061 0191 9	I.C.
IC603	MN4051B	001 060 6963 0	I.C.
TRANSISTORS			
Q1	DTC143TSTP	001 030 7246 6	TRANSISTOR
Q2	DTC114YSTP	001 030 5646 2	TRANSISTOR
Q3, Q4	2SA1309A-R	001 030 6079 7	TRANSISTOR
Q5	2SD1406-Y	001 030 5264 2	TRANSISTOR
Q6	2SB1015-Y	001 030 5584 9	TRANSISTOR
Q53	2SC3311A-Q	001 030 5279 5	TRANSISTOR
Q200, Q201	2SC2878A-T	001 030 2647 3	TRANSISTOR
Q204	2SA1309A-R	001 030 6079 7	TRANSISTOR
DIODES			
D1 ⚠	SVD1B4B42	001 032 3875 9	DIODE
D2, D3	MA4120-H	001 032 7217 1	DIODE
D4, D5	MA4075M	001 032 7212 6	DIODE
D6	SVD1SR35200A	001 032 3951 4	RECTIFIER
D7, D8	MA4030M	001 032 5807 3	DIODE
D10, D11	SVD1SS119-04	001 032 7555 6	DIODE
D12, D13	SVD1SS119-04	001 032 7555 6	DIODE
D14	SVD1SR35200A	001 032 3951 4	RECTIFIER
D15	MA4051-M	001 032 4947 6	DIODE
D16, D17	SVD1SS119-04	001 032 7555 6	DIODE
D21, D22	SVD1SS119-04	001 032 7555 6	DIODE
D23	SVD1SS119-04	001 032 7555 6	DIODE
D24	MA167	001 032 4142 5	DIODE
D25	MA4051-M	001 032 4947 6	DIODE
D27, D28	SVD1SS119-04	001 032 7555 6	DIODE
D29	MA167	001 032 4142 5	DIODE
D30	SVD1SS119-04	001 032 7555 6	DIODE
D51, D52	MA167	001 032 4142 5	DIODE
D53, D54	MA167	001 032 4142 5	DIODE
D55, D56	MA167	001 032 4142 5	DIODE
D57, D58	MA167	001 032 4142 5	DIODE
D59, D60	MA167	001 032 4142 5	DIODE
D61, D62	MA167	001 032 4142 5	DIODE
D63, D64	MA167	001 032 4142 5	DIODE
D65, D66	MA167	001 032 4142 5	DIODE
D67, D68	MA167	001 032 4142 5	DIODE
D74, D76	SVD1SS119-04	001 032 7555 6	DIODE

Ref. No.	Part No.	Part Code	Description
D500, D501	SVD1SS119-04	001 032 7555 6	DIODE
D502, D503	SVD1SS119-04	001 032 7555 6	DIODE
D504, D505	SVD1SS119-04	001 032 7555 6	DIODE
D506, D600	SVD1SS119-04	001 032 7555 6	DIODE
D601, D602	SVD1SS119-04	001 032 7555 6	DIODE
D603, D604	SVD1SS119-04	001 032 7555 6	DIODE
D605, D606	SVD1SS119-04	001 032 7555 6	DIODE
COILS AND TRANSFORMERS			
T1 ⚠ D, EH, EB, EF, EI, EW, EG	SLTK5K17	001 202 9047 7	POWER TRANSFORMER
T1 ⚠ EK, XL	SLTK5K18	001 202 9048 6	POWER TRANSFORMER
T1 ⚠ XA, XB	SLTK5K19	001 202 9049 5	POWER TRANSFORMER
COMPONENT COMBINATIONS			
Z53, Z54	EXBF10D8BLG	001 230 2837 5	COMPONENT COMBINATION
Z301, Z400	EXBF8E224J	001 230 2679 1	COMPONENT COMBINATION
OSCILLATORS			
X1	EF0FC4004A3	001 250 2080 4	OSCILLATOR
DISPLAYS			
FL1, FL2	SADBG435GK	001 001 0506 6	DISPLAY
FUSES			
F1 EW, EG	XBA2C12TR0	002 380 1545 3	FUSE
SWITCHES			
S1	SSHK73	003 435 6313 7	PUSH SWITCH
S2 ⚠ XA, XB	SSR187-1	003 430 2201 5	SW, VOLTAGE SELECT
S51, S52	EVQQAC07K	003 439 2143 3	SW
S53, S54	EVQQAC07K	003 439 2143 3	SW
S55, S56	EVQQAC07K	003 439 2143 3	SW
S57, S58	EVQQAC07K	003 439 2143 3	SW
S59, S60	EVQQAC07K	003 439 2143 3	SW
S61, S62	EVQQAC07K	003 439 2143 3	SW
S63, S64	EVQQAC07K	003 439 2143 3	SW
S65, S67	EVQQAC07K	003 439 2143 3	SW
S77, S78	EVQQAC07K	003 439 2143 3	SW
S79, S80	EVQQAC07K	003 439 2143 3	SW
S81, S82	EVQQAC07K	003 439 2143 3	SW
S83, S84	EVQQAC07K	003 439 2143 3	SW
S86, S87	EVQQAC07K	003 439 2143 3	SW
S88, S89	EVQQAC07K	003 439 2143 3	SW
S90, S91	EVQQAC07K	003 439 2143 3	SW
S92, S93	EVQQAC07K	003 439 2143 3	SW
S94, S95	EVQQAC07K	003 439 2143 3	SW
S96, S97	EVQQAC07K	003 439 2143 3	SW
S98, S99	EVQQAC07K	003 439 2143 3	SW
S100, S101	EVQQAC07K	003 439 2143 3	SW
S102	EVQQAC07K	003 439 2143 3	SW
BATTERY			
BAT1	BR2032-1VC	016 955 0030 9	

Ref. No.	Part No.	Part Code	Description
CABINET AND CHASSIS			
1 ⚠ D, EH, EB, EF, EI, EW, EG	SFDAB31E01-M	003 490 4350 9	POWER CORD
1 ⚠ XL	SJAG23	003 490 1056 4	POWER CORD
1 ⚠ XB	SJA182	003 490 5035 3	POWER CORD
1 ⚠ XA	SJA186	003 490 5442 2	POWER CORD
1 ⚠ EK	SJA189	003 490 5448 6	POWER CORD
2	SHR127	016 645 0037 9	SPACER, POWER CORD
3	SKU11651	016 802 2166 8	CHASSIS
4	SKL307	016 828 0325 7	FOOT
5 EH, EB, EF, EI	SGPHE70-KE	016 840 7802 9	REAR PANEL
5 D	SGPK400-2A	016 840 7801 0	REAR PANEL
5 EG	SGPK400-2B	016 840 7806 5	REAR PANEL
5 EW	SGPK400-2C	016 840 7807 4	REAR PANEL
5 EK	SGPK400-3A	016 840 7799 7	REAR PANEL
5 XL	SGPK400-4A	016 840 7805 6	REAR PANEL
5 XA	SGPK400-5A	016 840 7800 1	REAR PANEL
5 XB	SGPK400-6A	016 840 7798 8	REAR PANEL
6	SGYKHE70-KE	016 840 7803 8	FRONT PANEL (K)
7	SGXK121A	016 846 3762 6	ORNAMENT
8	SBCK64A	016 702 6979 0	BUTTON
9	SBCK63	016 702 6978 1	BUTTON
10	SBCHE70-KN	016 702 6976 3	BUTTON
11	SBCK61B	016 702 6977 2	BUTTON
12	SBC666-1	016 702 6076 0	BUTTON
13	SHE187-K	016 643 1026 8	SPACER
14	SHR301	016 645 0044 0	CLAMPER
15	SJF3057N	003 410 3829 3	TERMINAL BOARD
16	SJJ130-2	003 400 7317 2	JACK
19	SJT30440LX-V	003 410 6076 8	LUG TERMINAL
19	SJT30640LX-V	003 410 6149 8	CONNECTOR
20	SJT3611	003 410 6000 8	CONNECTOR
22	SJSK90403DS	003 403 7206 3	CONNECTOR
22	SJSK90503DS	003 403 7207 2	CONNECTOR
22	SJSK90803DS	003 403 7208 1	CONNECTOR
22	SJS50671DS	003 403 4401 4	CONNECTOR
25	SKC2050K96Q	016 800 3058 7	CABINET
26 D, EH, EB, EF, EI, EW, EG, XA	SJS9225	003 400 3946 5	SOCKET
26 ⚠ EK	SJS9332B	003 403 7377 5	CONNECTOR
27 EK	SJS9332A	003 403 7376 6	CONNECTOR
28 XL	SFEZQ34G01	016 645 0148 3	CLAMPER
29 EW, EG	SJT347	003 410 1830 8	FUSE HOLDER
SCREWS, WASHERS & NUTS			
51	XTV3+10G	005 501 0826 6	SCREW
52	XTB3+8G	005 501 2607 7	SCREW
53	XTB3+8GFZ	005 501 1595 8	SCREW
54	XTB3+8JFZ	005 501 0138 3	SCREW
55	XTW3+20T	005 501 3119 4	SCREW
56	XTBS3+20F1	005 501 2522 1	SCREW
57	SNE2095-5	005 500 4884 5	CABINET
57	XTB3+10B	005 501 0077 9	SCREW

Ref. No.	Part No.	Part Code	Description
PACKINGS			
P1 D, EH, EB, EI, EW, EG, XA, XB	SPGK304	016 971 5035 2	CARTON BOX
P1 EF	SPGK305	016 971 5062 9	PACKING CASE
P1 EK	SPGK306	016 971 5036 1	CARTON BOX
P1 XL	SPGK307	016 971 5063 8	PACKING CASE
P2 D, EH, EB, EF, EI, EW, EK, EG, XA, XB	SPSK114	016 977 3270 1	PAD
P2 XL	SPSK114-2	016 977 3321 7	PAD
P3 D, EH, EB, EF, EI, EW, EK, EG, XA, XB	SPSK115	016 977 3271 0	PAD
P3	SPSK115-2	016 977 3320 8	PAD
XL P4	SPPK53	016 978 0525 4	PROTECTION COVER
ACCESSORIES			
A1	SJPK2202	003 492 6415 1	CORD
A2	SJP2257K	003 492 5606 0	CONNECTION CORD
A3 D, EH, EB, EW	SQFK10164	016 983 5208 3	INSTRUCTION BOOK
A3 EG	SQFK10165	016 983 5209 2	INSTRUCTION BOOK
A3 EK	SQFK10166	016 983 5174 6	INSTRUCTION BOOK
A3 XB	SQFK10167	016 983 5204 7	INSTRUCTION BOOK
A3 EF, XA	SQFK10171	016 983 5206 5	INSTRUCTION BOOK
A3 EI	SQFK10172	016 983 5205 6	INSTRUCTION BOOK
A3 XL	SQFK10173	016 983 5207 4	INSTRUCTION BOOK
A4 ⚠	RJP120ZBS-H	003 402 1437 9	AC PLUG ADAPTOR

■ EXPLO

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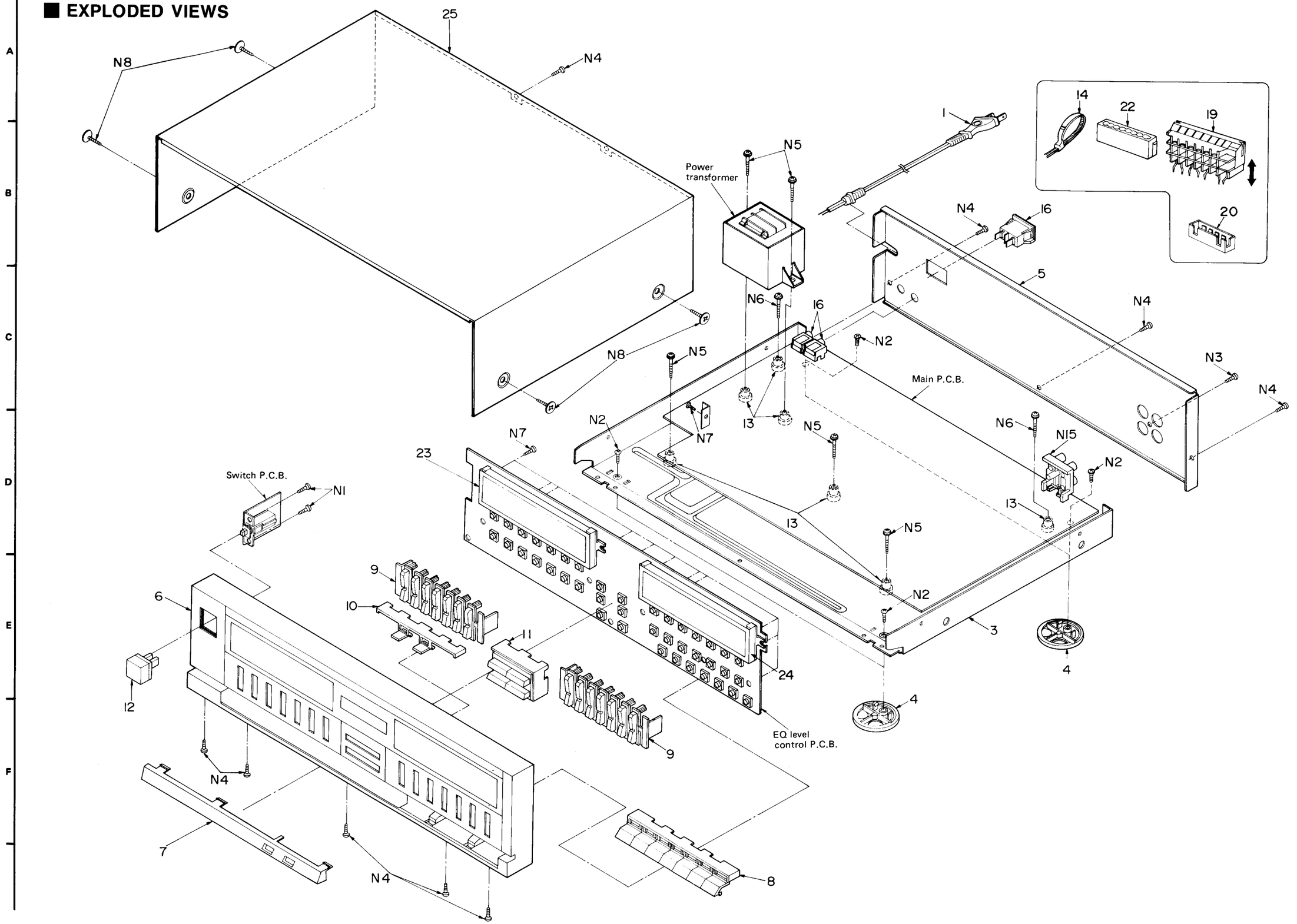
DAPTOR

■ EXPLODED VIEWS



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K870504450 YY

ORDER NO. HAD8707224S8

Service Manual

Equalizer

Supplement

Stereo Graphic Equalizer

SH-E70

Color

(K) . . . . Black Type

Area

Color	Area
(K)	[D] . . . . . Continental Europe
(K)	[EH] . . . . Holland
(K)	[EB] . . . . Belgium
(K)	[EF] . . . . France
(K)	[EK] . . . . United Kingdom
(K)	[EG] . . . . F.R. Germany
(K)	[Ei] . . . . . Italy
(K)	[EW] . . . . Switzerland
(K)	[XL] . . . . Australia
(K)	[XA] . . . . Asia, Latin America, Middle Near East, Africa & Oceania
(K)	[XB] . . . . Saudi Arabia

Please file and use this supplement manual together with the service manual for model No. SH-E70, Order No. HAD8704080C8.

Note:
This supplement has been issued to inform you that the each circuit has been changed in units having serial number suffixes "B" or later.

CHANGES

■ REPLACEMENT PARTS LIST

Ref. No.	Change of Parts No. OLD	→ NEW	Description	Schematic Diagram Zone
RESISTORS				
R11	ERDS2TJ331	———	Deletion, 330Ω, Carbon Resistor	D–11
R12	ERDS2TJ122	———	Deletion, 1.2kΩ, Carbon Resistor	D–11
CAPACITORS				
C7, 8	ECEA1HU010	———	Deletion, 1μF, Electrolytic Capacitor	F–10
C16	ECEA0JU222	———	Deletion, 2200μF, Electrolytic Capacitor	E–10
C33, 34	ECKD1H103PF	———	Deletion, 0.01μF, Ceramic Capacitor, Except [EG]	E–12
C70, 71	ECBT1H331KB5	———	Deletion, 330pF, Ceramic Capacitor	B–19
C72, 73	ECBT1H331KB5	———	Deletion, 330pF, Ceramic Capacitor	B–19
C74, 75	ECBT1H331KB5	———	Deletion, 330pF, Ceramic Capacitor	A–19
C76	ECBT1H331KB5	———	Deletion, 330pF, Ceramic Capacitor	A–19
C77, 78	ECBT1H331KB5	———	Deletion, 330pF, Ceramic Capacitor	A–18
C80, 81	ECBT1H331KB5	———	Deletion, 330pF, Ceramic Capacitor	E–19
C82, 83	ECBT1H331KB5	———	Deletion, 330pF, Ceramic Capacitor	E–19
C84, 85	ECBT1H331KB5	———	Deletion, 330pF, Ceramic Capacitor	D–19
C86	ECBT1H331KB5	———	Deletion, 330pF, Ceramic Capacitor	D–19
C87, 88	ECBT1H331KB5	———	Deletion, 330pF, Ceramic Capacitor	D–18
C200, C201	ECCD1H151K	———	Deletion, 150pF, Ceramic Capacitor, Except [EG]	D–1
DIODES				
D11, 12	SVD1SS119–04	———	Deletion, Diode	D–11

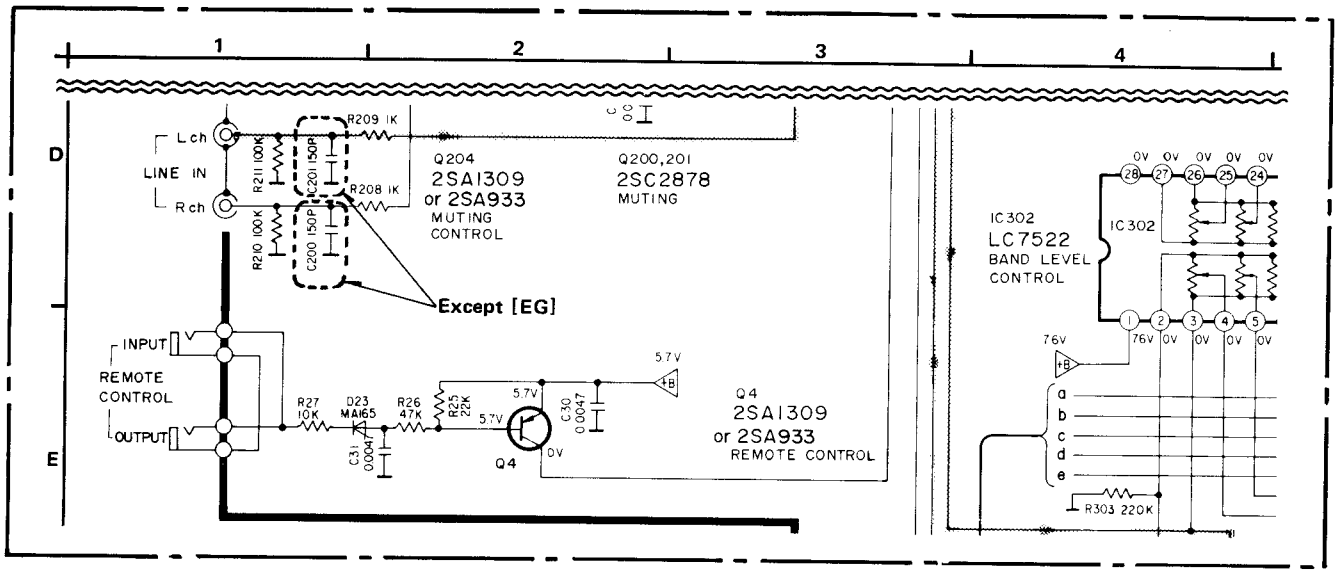
Technics

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

■ SCHEMATIC DIAGRAM

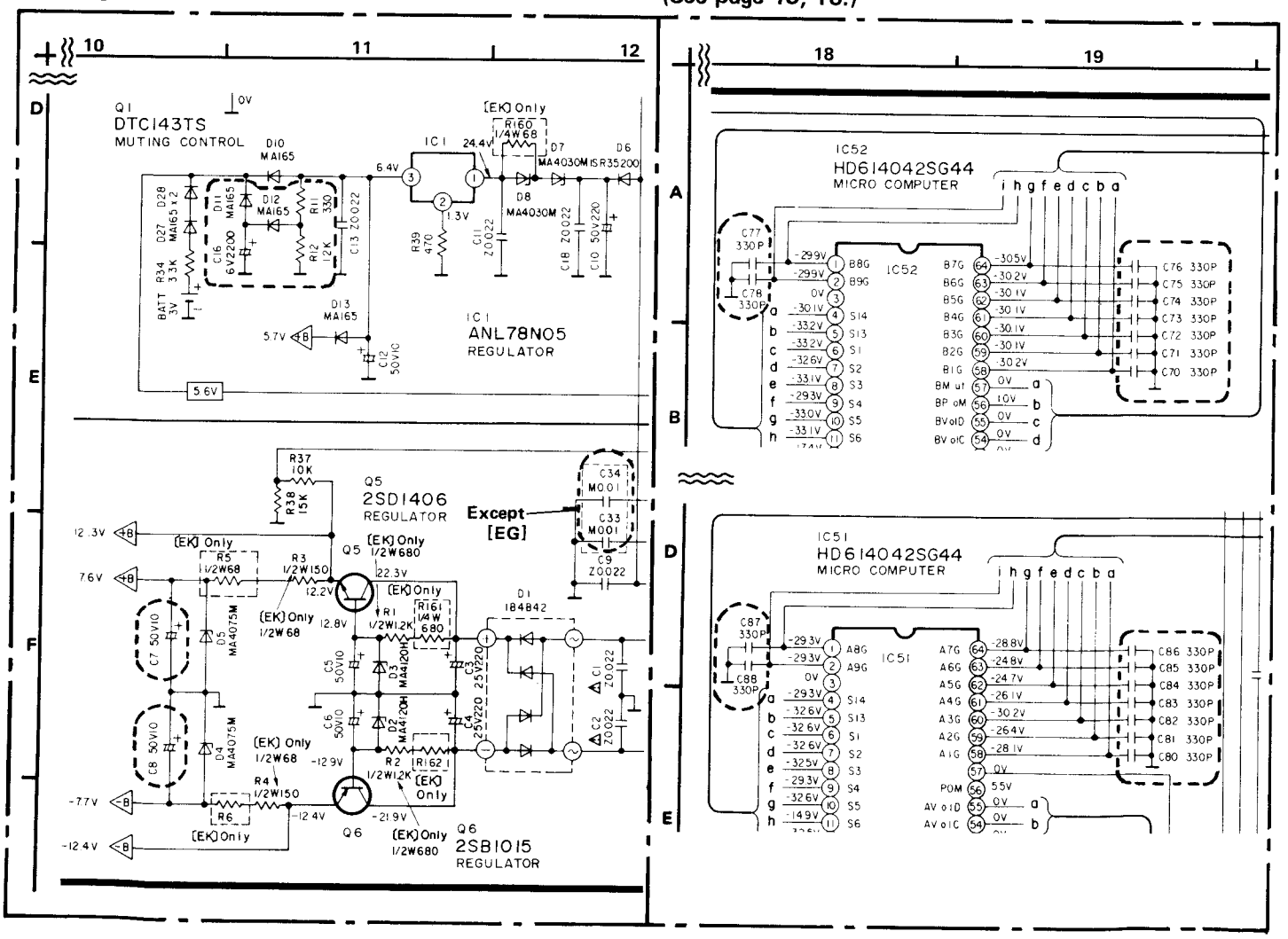
(⬭ : Deletion, New Type only)

(See page 12.)



(See page 14.)

(See page 15, 16.)



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